MILITARY REVIEW

Command and General Staff College

Fort Leavenworth, Kansas

INDEX

to Volume XXIX

April 1949—March 1950

Editor's Note

This index to Volume XXIX, April 1949 through March 1950, of the MILITARY REVIEW, is divided into three parts for the convenience of the reader.

Part I, a Title Index, is an alphabetical index of the titles of all articles printed in the main section of the magazine and of all articles printed in the section of *Foreign Military Digests.*

Part II, a Subject Index, is an alphabetical index by subject with appropriate cross-references, of all articles printed in the main section, the section on *Military Notes Around the World,* and the section on *Foreign Military Digests.*

Part III, an Author Index, is an alphabetical index of the authors of articles which have been printed in the main and *Foreign Military Digests* sections.

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The State of the National Military Establishment

The Honorable James Forrestal, Secretary of Defense

WHILE many problems press for solution, they should serve to concentrate attention on the main question: How good is our Military Establishment?*

At the height of hostilities four years ago, this nation possessed the greatest military might the world has ever known. During the period of emergency, it inducted 12,000,000 of its citizens into the armed forces. It supplied them with the best weapons and equipment. It built arsenals and shipyards, mills and factories, to produce the implements of war. Working together, labor and management performed a stupendous feat of production in turning out the guns, planes, tanks, ships, and other weapons with which the war was won. America's war effort was a magnificent demonstration of patriotic teamwork.

With victory, a stampede for demobilization swept over the country. The rush to disarm, premature and unwise though it turned out to be, was the natural reaction of a nation which detests war and wants only a just, honorable, and enduring peace. But as the international situation continued tense, the nation's attention again was directed belatedly and somewhat apprehensively to the national security.

* From the "First Report of the Secretary of Defense, 1948."

Since the Office of the Secretary of Defense was created, it has been engaged to the extent of its powers in putting into effective operation the comprehensive national security program for which the Congress provided. This Office is now able to report that the state of the National Military Establishment is sound; that the policies and functions of the departments and agencies concerned with the national security are being integrated and coordinated; that the unification of the Army, Navy, and Air Force into an effective combat team is proceeding as rapidly as could be reasonably expected; that all three services are in a better position to perform their missions than they were before the National Security Act became law; and that this nation, therefore, is able to a greater extent to implement its policies, if need should arise, with military power. There will, however, be a continuing challenge to attain the complete integration and unification contemplated by the act.

Department of the Army

The basic function of the Army is to be prepared for prompt and sustained combat operations on land.

Events have transformed Army forces abroad into the outposts of national se-

After a year of unification, the National Military Establishment is sound, the services are better able to perform their missions, and the nation therefore is in better condition to implement its policies

curity. These forces must be given maximum support now and as long as they are on the frontiers of the national security. Forces in the United States must be built up to a point where the overseas troops can be assured of reinforcement in an emergency by land forces as well as sea and air forces. The aim of the Army program is to provide the minimum degree of readiness which can give reasonable assurance of meeting an emergency.

If the Army is to function as an effective member of the national security team, there must be a clear public understanding that land forces will continue to be indispensable as a primary fighting arm. This fact has been obscured since World War II by a host of collateral functions which have precluded the Army from preparing itself for an emergency. The Army's fighting role should not be overlooked or underrated as a result of a public misconception that air power can replace land power.

Although the United States Army cannot and need not seek parity in size with other great armies, it must be of such composition and nature that, together with naval and air forces, decisive military action can be taken. Especial emphasis must be laid upon airborne and amphibious Army forces to operate with the Air Force and Navy.

Beginning with fiscal year 1949, the Army placed emphasis upon reconstituting a reasonable portion of its combat potential. It is building up the general reserve, which consists of the Army forces within the United States and is divided into a static defense force for the defense and protection of key installations; and the mobile striking force, for immediate deployment overseas.

On 30 June 1947, the Army consisted of 10 understrength divisions with a total strength of 684,000, as contrasted to a peak of approximately 6,000,000 during the war. By the following June, the overall strength had dropped to 552,000. All but a handful of the Army was involved in activities, which, although essential, prevented it from maintaining an effective potentiality for combat. Losses to the Army averaged almost 40,000 a month during the fall of 1947 and continued at the rate of approximately 20,000 a month until the spring of 1948.

The world situation required an increase in the authorized strength of the Army. The Congress, in June 1948, passed the Selective Service Act. The effect of the passage of the act on the continued and intensified recruiting campaign is indicated by the fact that enlistments have increased from an average of 20,000 a month during the spring of 1948 to 39,000 in the month of July, and 45,000 during August. A considerable portion of the strength of the Army has gone into the requirements for occupation and military government of former enemy and liberated areas. The increase in Army strength authorized by the Selective Service Act will be applied primarily to the mobile striking force to raise its strength to 228,000 men.

The Army expansion program contemplates, subject to the availability of funds, that 25 fully equipped divisions with necessary supporting combat and service troops will be provided over a period of years. They will constitute with the Navy and Air Force that force in being with which to meet the initial shock of war if it should come. Units not provided from Regular Army and National Guard sources will be furnished by the Organized Reserve Corps. However, full implementation of the 25 division Army program will depend on the extent of appropriations and inauguration of effective measures to raise the level of training of Reserve components so that they can be employed operationally in an emergency.

Joint Training

Shortages and rapid turnover of personnel have handicapped training and imposed additional difficulties in providing for expansion. The Selective Service Act of 1948 is expected to provide a more substantial basis for the development of combat proficiency and readiness, and to permit the conduct of joint and combined training exercises on a scale which has been impracticable since demobilization in 1945 and 1946.

Notwithstanding serious personnel shortages and limited training status, several training exercises of importance were conducted during the past 15 months.

In October 1947, the Army and Navy participated jointly in Exercise *Seminole*, an amphibious-armored exercise conducted in the Gulf of Mexico. During the winter the Army and Air Force in Exercise *Yukon* moved reinforced rifle companies from Fort Lewis to Alaska in four separate maneuver phases, and conducted field maneuvers including air-transported operations within Alaska. In Exercise *Snowdrop* at Pine Camp, New York, Army and Air Force units conducted battalion-scale airborne maneuvers and gained valuable experience in operating in severe cold and deep snow.

In Exercise *Combine III*, Army, Air Force, and Navy and Marines aviation units combined at Eglin Field to stage a convincing demonstration of teamwork in bombardments, air support, and airborne missions. Subsequent amphibious operations on the west coast and off Argentia, Newfoundland, tested the latest doctrine in this field.

The high point of the year's training was attained when the 82d Airborne Division, supported by two Air Force troop-carrier groups, engaged in Exercise *Assembly* in May at Camp Campbell, Kentucky, in the first field maneuver on a division scale conducted since the war.

These training exercises provided units and individuals with valuable experience in field operations, under simulated combat conditions. The success of these relatively small-scale operations emphasized the need for intensive field maneuvers on a larger scale, and reflect a requirement for planned Army-Navy-Air Force training exercises related to missions and planned employment in emergencies, in order to perfect planning and coordination among the three services.

An integral part of the information program has been the troop information and education program designed to make every man a better citizen and soldier. By emphasizing to the individual the importance of his job; by informing him of the major issues affecting the national welfare; by stressing citizenship; and by providing opportunities for individual educational improvement, it is hoped to build a better Army and a sounder national security.

Reserve Forces

The Army developed its plan for inactive-duty training, storage, and administrative facilities for the reserve components, to include a firm criteria and plans to insure the maximum fiscal economy through joint utilization of facilities by all reserve components of the three services.

During the fiscal year 1948, the National Guard expanded from 87,000 officers and men to 289,000. The past training year has been the most successful in the history of the National Guard. In addition to armory training, 219,000 officers and men attended summer field training. The units which did not attend in 1948 will complete their field training in June 1949. With reference to service schools, 1,602 officers and 4,805 enlisted men completed some form of resident instruction during fiscal year 1948. This represents a greater number than attended during the 25 years preceding World War II.

Progress has been made during the past year in the Army Reserve program. Between 1 July 1947 and 18 September 1948, table of organization units have increased from 1,200 to more than 9,500. Unit training was initiated during the summer of 1948 at Army posts throughout the country. More than 27,000 Reserve officers and enlisted men received active-duty training for varying periods up to 90 days.

The source of new Reserve officers has been expanded with the activation of 56 new ROTC units at educational institutions throughout the country. The 467 senior division units and 138 junior division units have a total enrollment potential of more than 200,000, the attainment of which is anticipated in fiscal year 1950.

Logistics

Funds appropriated for the Army were below minimum requirements. This situation was aggravated by the continuing rise in prices and added logistical activities and responsibilities.

Maximum utilization was made of existing stocks. Procurement from fiscal year 1948 funds provided only small quantities of newly developed items and permitted replacement of only a portion of worn-out equipment.

One of the most pressing problems of the Army, and of the other services as well, is inadequate family housing. There exists an unfilled requirement of about 165,000 sets. This critical situation will not be alleviated except in a minor degree by the 1949 construction appropriation which provides only 1,500 sets of quarters. Eighty-five per cent of the Army personnel who are authorized family quarters will still be unhoused, with resultant lowered morale and loss of efficiency.

Inadequacy of funds has caused postponement of essential maintenance. This will not only increase the cost of repair when it is eventually performed, but also leave the bulk of our troops housed and operating in substandard facilities to the detriment of efficiency and morale.

The Army is, generally speaking, equipped with World War II type equipment. However, small quantities of the less expensive items of newly developed equipment have been procured. Funds were sufficient to buy practically no heavy equipment. Funds and personnel ceilings provided for maintenance of equipment were not adequate to prevent deterioration of many major items.

The task of occupation requires the control or supervision, by the United States or jointly with other powers, of about 200 million people. In both Europe and the Far East the Army is enforcing the necessary restraints to prevent a revival of fascism and militarism. At the same time, it is encouraging greater economic contributions from the occupied countries in order that these countries may sooner achieve a greater degree of self-support and become a positive factor in the rehabilitation of a war-ravaged world.

Department of the Navy

The provision and maintenance of naval forces for oversea deployment in the furtherance of United States policy and implementation of the National Security Act have been the chief items of concern to the Department of the Navy during the last year. Basic plans are being kept under close review to insure their adequacy for any contingency. These plans have reached the stage where completion of national mobilization plans and policies is needed to give them the firm basis required for utmost effectiveness. Integration of an over-all national plan is essential to further progress in this respect, and it is hoped to effect such integration through the National Security Resources Board in the coming year.

Costs are becoming a matter of concern. The Navy's operating requirements are be-

ing met, but only by extensive use of war-reserve stocks and operating inventories, and these are being depleted to an unwise degree. The approaching exhaustion of these stocks will inevitably result in greater appropriations to maintain the present level of naval operations. Although the effect of rising prices is also felt keenly, a still greater cost factor is presented by the increasing complexity of weapons and equipment.

The Navy has been forced to defer, during the past few years, much of the maintenance work on its shore facilities in order to remain within the funds available for this purpose. The amount of this deferred maintenance has accumulated to unsound proportions, and is developing into a lien on future funds that will be difficult to liquidate. Unless substantial inroads can be made into the accumulated deferred maintenance, many facilities will deteriorate for lack of prompt repair. Many temporary wartime structures are still in use, and replacement with permanent construction is needed, both for efficiency and to minimize maintenance costs.

With the developments in weapons and equipment that have taken place since World War II, particularly in aircraft and submarines, it is apparent that radical revisions of combat tactics and concepts are necessary, and the Navy is preparing itself in accordance with these developments. A thorough study is being made of the various possible attack maneuvers, lead-angles, trajectories, and ammunition requirements for high-speed fighters and bombers. Improvements in anti-submarine measures are continuing in order to counter high-speed, deep-diving, longer-submerging submarines.

In the continuing development of great airplane speeds, new world speed records were established in August 1947 by the Navy's jet plane "Skystreak," which, during two periods of flying, reached speeds of 640.7 and 650.6 miles per hour, a record broken again in 1948 by an Air Force experimental plane which flew faster than sound. Successful shipboard launching of a V-2 missile took place in September 1947. Jet aircraft were operated for the first time from carriers at sea. While jet operations were limited, they provided valuable information for the future use of such aircraft in the fleet.

The Navy-sponsored fundamental research in university, industrial, and government laboratories was stabilized during the year, both in level of expenditures and number of projects. Specific results achieved by individual projects may be found in the many technical papers and scientific journals. In general, the products of this research are making themselves felt and are of inestimable value to development programs and technical planning. Their influence on these programs will increase markedly during the coming year.

A problem was encountered during the year in maintaining the Atlantic and Pacific Fleets at equal enlisted personnel strengths. In the first quarter, the Pacific Fleet suffered greater losses than the Atlantic Fleet from expiration of enlistments; in November, this disproportionate attrition had shifted to the Atlantic Fleet. However, by January 1948, the losses in each fleet were balanced, and more equal strengths maintained for the rest of the year. Subject to availability of funds, it is planned to expand the Navy to a strength of 50,100 officers and 409,900 men by 30 June 1949, and to 62,000 officers and 500,000 men by 30 June 1950. Enrollments in the Naval Reserve increased from a grand total of 785,915 on 1 July 1947, to 1,003,458 on 1 July 1948, or 85 per cent of planned strength.

The effect of rapid demobilization on the enlisted rating structure has not yet been overcome. A three-year training pro-

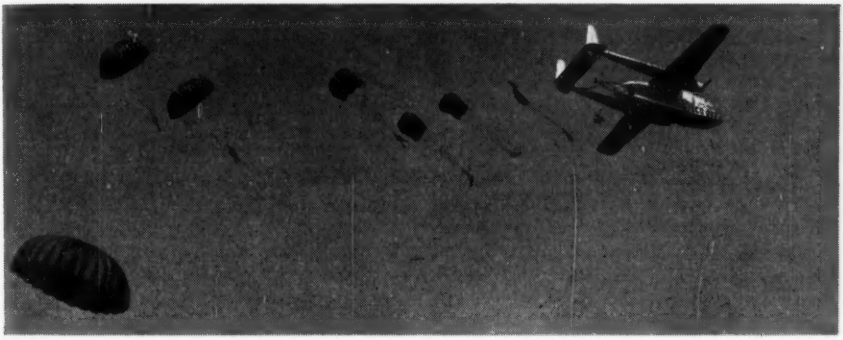
gram has been instituted specifically for the purpose of bringing ratings into balance. The nation-wide shortage of medical personnel has its counterpart in Navy shortages of doctors, dentists, and nurses. The Army-Navy Public Health Service Medical Officer Procurement Act of 1947 was designed to alleviate this shortage by providing additional pay and authorizing initial appointment up to the grade of Captain, USN. While the situation is still not good, the act has had the effect of bringing resignations virtually to a standstill and at the same time is attracting a fair number of medical officers to active duty.

The Navy's condition of readiness has been stepped up to a level appropriate to current preparedness objectives. The matériel condition and operating standards of the fleet have shown great improvement, and operational training programs have given gratifying results. The condition of shore facilities leaves much to be desired because of the deferred maintenance factor. Shortages of trained engineers and technical personnel, both military and civilian, are still acute, but military training programs are making some headway, and the civilian personnel situation should improve with the increased college output and training by-products of research programs. The Navy's tremendous variety of complicated equipment and techniques causes it to be affected by these shortages.

Increased appropriations for aviation resulted from Presidential and Congressional studies during the year. In order to build up the aircraft inventory to the expanded program approved by Congress in June, the Navy will withdraw most of its aircraft now in storage during fiscal year 1949. These will be placed in operating condition and used to provide 10,687 operating aircraft and a total service inventory of 14,500 aircraft. Additional squadrons and air groups, required to provide two air groups per carrier, will be outfitted, and several shore facilities for aviation will be reactivated to meet the expansion.

The mobile forces of the Navy are divided into the two major fleets operating in the Atlantic and Pacific areas. The principal oversea operations of the Navy

The XS-1 (left), Air Force experimental plane, has pierced the formidable sonic barrier. From the deck of the USS *Midway* (right), the Navy launched a V-2 rocket.—US Air Force and Navy photos.



During the first year of unification, the military services engaged in many activities which served to better prepare them to carry out their missions. Above, 82d Airborne paratroopers drop from a troop carrier during Exercise *Snowdrop*, a joint Army-Air Force training project. New cold weather tactics were developed by Army ground forces (right), during Exercise *Yukon* in Alaska. Around the clock operations of the momentous Berlin airlift called for joint efforts on the part of all US services, combined with British help; in the night scene below, Air Force C-54s are being unloaded at Templehof as other planes take off.—US Army and Air Force photos.

during the last year were in support of our troops in the occupied areas. Naval vessels were maintained in primary ports in these areas, and protective patrols and visits to other important ports were made in all areas as warranted.

Department of the Air Force

The Air Force appreciably enhanced, during fiscal year 1948, its current capability to discharge its short-range emergency mission, laid the foundation for an Air Force capable of carrying out long-range defense mission, and received the initial increments for such a long-range program. This progress was concurrent with its discharge of overseas occupational responsibilities and during a period of transition from its former position as a part of the War Department to the status of a separate department.

Before achieving this status, and in anticipation of it, the Air Force Headquarters and field activities had been reorganized. The year's operation as a separate department indicates that this functional type of organization is basically sound and the conversion from peacetime to wartime functioning should require little, if any, change in the basic structure. A continuing analysis is being made of organizational functioning and correlated with joint studies of the over-all organization of the National Military Establishment.

The estimated current short-term combat capabilities of the Air Force increased approximately 20 per cent, according to an estimate based on (1) increase in number of tactical units and receipt of 96,000 graduates from the Air Force educational and training system; (2) improvement in existing equipment, as exemplified by increased inherent range of B-29 and B-50 bombers, and further development of air refueling technique and equipment; (3) introduction of jet fighters and other advanced types of equipment into combat units; (4) completion of a considerable number of valuable tactical studies; (5) realistic field exercises, including many with joint forces; (6) growth of civilian components; (7) progress in joint mobilization studies; (8) strengthening of the critical materials stock pile; (9) improvement in availability and in technique of handling special weapons.

Major unit strength of the Air Force increased by 17 groups. The Air Force reports that a 55-group increment of a 70-group program was attained in January 1948 and that action toward reaching the 66-group increment by 30 June 1949, and 70 groups by 30 September 1949, subject to availability of funds, is proceeding on schedule.

An Air Force flying laboratory (the XS-1) penetrated the sonic barrier, marking the first time that man has flown faster than sound. This event has been evaluated as being as important as the Wright brothers' flight at Kitty Hawk.

During the year, the Air Force introduced 13 new advanced models of aircraft, including 4 new fighters, 3 new transports, 2 new bombers, a high-speed trainer, a pilotless jet target plane, a helicopter, and a cargo glider. Numerous modifications were made in existing aircraft and aircraft engines, resulting in appreciable increase in aircraft range, particularly the range of the B-29 and B-50 bombers. Further improvements were made in air-to-air refueling, which can be utilized, according to current Air Force estimates, to increase our existing bomber range by 20 per cent; the ultimate goal is a range increase of 50 per cent.

The strength of the Air Force increased to 387,730, within a fiscal goal of 398,729, and indications are that, subject to the availability of funds, the 1949 fiscal year goal of 444,500 may be reached.

Acceptances of new aircraft increased 56 per cent; within this increase was a 40 per cent increase in acquisition of

jet fighters. While several thousand aircraft were withdrawn from storage and placed in operating condition, this placed a severe drain upon maintenance resources; the B-29, for example, requires 13,000 man-hours to be withdrawn from storage and placed in operational condition.

The aircraft industry is behind schedule in production of new aircraft to meet the requirements of the long-range program. Underlying this situation is the fact that for two and one-half years after VJ-day the level of production was below the minimum essential to a healthy aircraft industry.

Passage of Public Law 547 by the Eightieth Congress in May 1948 provided funds for the initial increment of new aircraft, but found the aircraft industry ill-prepared to cope with a multitude of expansion problems. The most perplexing of these are (1) technical aspects of design and manufacture incident to transition from conventional to jet-type aircraft; (2) limited availability of essential materials and components normally produced by suppliers outside the aircraft industry who have reconverted to other kinds of production since the war; (3) manpower problems resulting from the necessity of rapid expansion during a period of full employment and rising wages and other costs. These problems are not insuperable, but their solution requires intensive cooperative effort.

A considerable portion of the major maintenance on Air Force commercial-type transport aircraft has been, and is being, performed by private enterprise. This procedure is designed not only as a support measure in this segment of the aircraft industry but also to relieve the load on the Air Force depot system. Contracts of this nature are awarded on a low-bid basis to organizations qualified to perform the work. There are ample facilities in the aircraft industry to cover all contract maintenance work contemplated by the Air Force. With regard to combat aircraft, it is considered essential that all heavy maintenance and overhaul be performed within the Air Force depot system. The same general procedure in this respect is being followed by the Navy.

The Air Force is presently unable to provide family quarters on bases in the United States to more than 25 per cent of its enlisted and officer personnel entitled to such quarters. About half of the available family quarters are permanent-type construction; the remainder are of World War II temporary-type construction, such as converted barracks.

The Air Force had only two-thirds of the necessary base facilities for its existing units at the end of fiscal year 1948, and the requirement will increase with expansion of the long-range program. More than half of existing bases are of the temporary World War II type. They must be overhauled and extended to prevent deterioration and to make the runways, taxiways, aprons, and other structures suitable for the larger, heavier, more advanced types of aircraft scheduled in the program. Thus, the base development program must be closely integrated with the aircraft development program, and necessary base facilities must be provided beginning now and extending over a period of years.

At the end of fiscal year 1948, there were only 847 medical department personnel on duty with the Air Force, as against a requirement of 1,440. If the present trend continues, there will be available between 300 and 400 doctors as against a requirement of 1,600 at the end of fiscal year 1949.

Berlin Airlift

On 21 June 1948, rail traffic to the three western zones of Berlin was cut off by the Russians. United States Air Force planes began to fly food into Berlin on

a small scale the same day, and large-scale operations started on 26 June, when 80 tons of food were carried to Templehof Air Base in Berlin by 32 flights of C-47 transports from Rhein-Main Air Base near Frankfurt. On 27 June, the United States Military Government in Berlin cabled Washington, requesting that 45 heavy air transports be dispatched to the commanding general of United States Air Forces in Europe as soon as possible.

In order to comply with this request, the Air Force had to move transport squadrons representing a total of 54 C-54s from bases as far distant as Alaska, Hawaii, and the Caribbean area, as well as one squadron from the Tactical Air Command in the United States, and nine planes from the Military Air Transport Service. By 4 July these planes had made 115 flights from the Rhein-Main Air Base to Berlin, delivering more than 2,000,000 pounds of food, coal, and other supplies to the blockaded western sections of the city, 265 miles from Frankfurt. These planes carried an average of nine and one-half tons of cargo on each trip.

A crew flying Operation *Vittles*, as this mission is now commonly known, may make as many as three trips a day, or fly under adverse weather conditions more than 12 hours a day, and be back on the job the next afternoon. As of 18 September, the United States airlift averaged 3,600 tons a day, and an additional 1,100 tons were being flown into Berlin daily by the British Royal Air Force, which has been a substantial partner in the airlift. This amounts to four pounds daily for each resident of the Allied Zones in Berlin. On 18 September, 85 days after Operation *Vittles* had been inaugurated, the United States Air Force had flown more than 174,000 tons of supplies into Berlin. Our aircraft losses during this period were three C-47s and two C-54s, a wreck rate about one-half the current rate for the Air Force as a whole.

The Army has maintained an unbroken pipeline of food and medical supplies for transportation by the airlift. The Army has procured thousands of tons of surplus foods from the Department of Agriculture. These foods had been acquired by the government through its price-support program. It is a credit to the Army that this food-relief program, not only for Germany, but also for all the occupied areas of Europe and Asia, has been effected without serious interference with our domestic economy.

The Berlin airlift is an example of unified operation. The Department of Agriculture makes the supplies available. The Army, through the Food Administrator for the Occupied Areas, delivers the food to the Air Force in Germany, and the Air Force then assumes responsibility for transporting it to Berlin. The Navy is also participating by delivering gasoline to supply the Air Force, and in October Navy planes also were assigned to the airlift.

The operation has provided an excellent mobilization test for the Air Staff and Air Force field organizations. Air Force capability and flexibility at all echelons of commands have been tried as to their adequacy, since Operation *Vittles* made it necessary to modify current programs by transferring organizations to new oversea stations, by rearranging Military Air Transport Service to commands throughout the world, and by moving the center of gravity of our supply bases. The accelerated rate of activity of the organizations and equipment engaged in the operation made this necessary.

A plan has been approved to assign 162 C-54s to Operation *Vittles*. It will permit increased airlift at decreased cost and will facilitate the movement of the necessary tonnage under adverse weather conditions. This fleet of C-54s, which represents a larger operation than several of our major air lines combined, will be

supported by 200-hour maintenance checks at Burtonwood, England, and the planes will return to the United States for 1,000-hour inspection and overhaul. This will provide 32 additional round trips per month of airlift across the Atlantic.

The Air Force estimate of the "constructed cost" of Operation *Vittles* as of 18 September was $31,210,843. "Constructed cost" does not include all the continental support which is provided, nor does it include depreciation of aircraft. It consists of the cost of fuel and oil; crew pay; base support provided in Germany; and the transportation of equipment, supplies, and personnel to Europe in so far as these expenses are above the planned rate.

Selective Service and UMT

The state of the National Military Establishment depends to a large extent on manpower. Our weapons are useless unless we have men trained to employ them. Our only sure source of manpower today is selective service. The significant developments in the fields of selective service and universal military training during the first year of existence of the Office of the Secretary of Defense may be summed up as follows:

A peacetime Selective Service Act was passed by the Congress and is now in effect.

The Office of Selective Service and the Selective Service System were reestablished.

The registration of all males between the ages of 18 and 25, both inclusive, has been completed.

Inductions have commenced, with calls of 10,000 for the month of November, 15,000 for the month of December.

A special one-year enlistment has been established for 161,000 18-year-olds, including an obligation to serve in a reserve component for an extended period of time upon completion of the one year of active duty.

Coordinated training plans and drafts of legislation have been prepared to implement the universal training program proposed by the President's Advisory Commission on Universal Training (the Compton Commission), and extensive hearings on this subject have been held by the Armed Services Committee of the Senate (hearings having previously been held by the Armed Services Committee of the House in June and July 1947).

The Selective Service Act of 1948, which became effective on 24 June has done much already to correct the manpower problem in the armed services. It has greatly stimulated recruiting, improved the physical and mental qualifications of the personnel of the services, and has furnished the means for an orderly, fair, and certain method of attaining and maintaining the required strengths of the services.

The selective service process is not the solution, however, to the nation's long-range military manpower and training problems; for these we need universal training. The principles upon which the Compton Commission has based its recommendations are as valid and applicable in today's circumstances as they were 18 months ago. Permanent legislation in this field as a successor to the Selective Service Act is essential if we are to achieve an acceptable degree of national security.

The program for military training, as set forth in the Report of the President's Advisory Commission on Universal Training, has constituted the framework for National Military Establishment planning in this field.

Airtransportability of the Infantry Division

General Jacob L. Devers, *USA*
Chief, Army Field Forces

DURING the preparation of a paper on Operation *Dragoon*, the invasion of Southern France, which I was privileged to command in the dual capacity of Deputy Supreme Allied Commander of the Mediterranean Theater of Operations and Commanding General, Sixth Army Group, the following quotation from Macaulay was called to my attention:

"The dragoon has since become a mere horse soldier. But in the Seventeenth Century he was a foot soldier, who used a horse only in order to arrive with more speed at the place where military service was to be performed."

It seemed to me at the time, and still does, that there is an apt analogy between this metamorphosis of horse-transported infantry into cavalry and our current Pegasian evolution. We have already seen cavalry and artillery progress from horse to motor transport, and specialized infantry to motor and/or air transport. Now we are about to see all three, infantry, cavalry, and artillery, wholly airtransportable—to arrive with more speed at the place where military service is to be performed.

Of the fighting equipment of the standard United States Army infantry division today, only the tanks are not now airtransportable in airplanes which are in production. With the progress which has already been achieved, there is every reason to believe that in the near future a combat effective infantry division, less medium tanks, can be completely transported by air.

Air Developments

Notable recent developments in Air Force troop and cargo carriers include the C-119B, XC-120, C-124A, and the XH-16, each of which brings the Army and Air Force nearer their common goal of a completely airtransportable infantry division.

The C-119B, in the medium transport class, is similar to the familiar C-82, but has a wider cargo compartment and more powerful engines, permitting an increase in payload among other improvements. The C-124A, in the heavy transport class, is based upon the structure of the C-74, but is modified to include a nose-loading ramp and an enlarged cargo compartment capable of accommodating all but a few items of equipment of a field army.

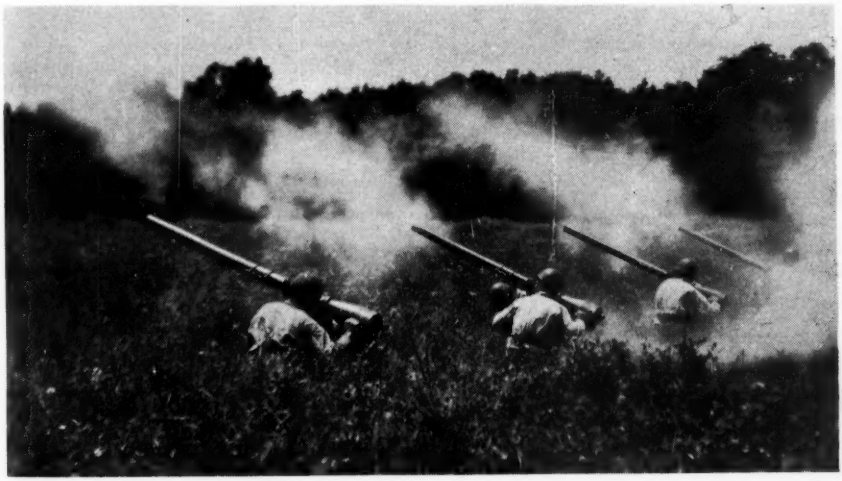
Both the XC-120 and the XH-16 embody

In this survey of airtransportability, General Devers declares that there is reason to believe that "in the near future a combat effective division, less medium tanks, can be completely transported by air."

the "pod" principle, the idea of a detachable cargo compartment, applied in the first instance to an airplane and in the second to a helicopter. The XC-120 is similar to the C-119B, but with a quadricycle landing gear which permits the "tractor" to taxi over the "pod." The XH-16 is a twin tandem rotored helicopter with a fuselage of the general shape and approximate dimensions of the C-54, plus a slightly smaller pod.

turn-around time at both base and airhead would be reduced to a minimum. Aircraft would not have to be unloaded under combat conditions; they would simply unhitch their pods and take off immediately. At their base, they would again be delayed only the time necessary for servicing. While they were being serviced, an already-loaded pod would be attached, ready for the jump forward.

The pods themselves would be of im-



Lighter-weight infantry weapons contribute their part toward the goal of making the infantry division completely airtransportable. Above, a battery of 75-mm recoilless rifles demonstrates the firepower of this new weapon.—US Army photo.

These pods will be to the aircraft what the highway trailer is to the truck-tractor. And, just as trailers have infinitely stepped up the efficiency of truck transport, the pod would virtually triple the transport efficiency of aircraft, particularly as applied to military operations.

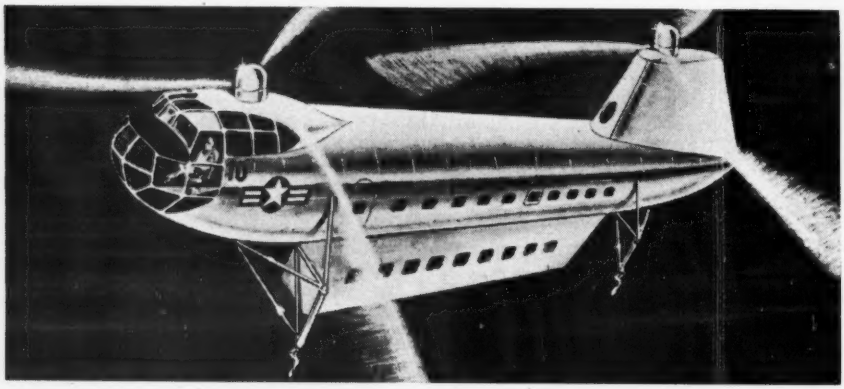
In an airhead operation employing aircraft with these detachable compartments, mense value in the airhead, particularly in arctic operations, in which some sort of shelter is imperative. Some pods, their original cargo unloaded, would be convertible to aid stations. When filled with wounded, they would be attached to returning planes for speedy and efficient evacuation.

Others could be used as command posts, ordnance repair shops, message centers,

troop shelters, etc. Where the tactical situation did not demand further dispersion of supplies in an airhead, unloading time and labor would be obviated. The pods themselves would be used as supply depots for the issue to units of rations, gasoline and ammunition, and then, when empty, would become shelters. Planes returning podless would make better speed and use less fuel on the return halves of their round trips.

It is not difficult to envision application of the pod principle to the air-

Speedy reconnaissance planes, supersonic fighters, and highly specialized bombers are all engines of war, with little or no commercial application. But the very qualities which characterize military transports—big payload possibilities, cargo pods, the ability to take off and land on runways of medium length and inexpensive construction, and general work-horse efficiency—have infinite commercial possibilities. They will help to keep our aircraft industry healthy and humming, in peacetime, so that, in time of emergency,



The "pod" principle of a detachable cargo compartment is another important advance in airtransportability. The XH-16 (above) employs the "pod" with a helicopter. The XC-120 applies the principle to a plane.—US Air Force photo.

transport of equipment which remains irreconcilable to fuselage or pod dimensions. Exceptionally bulky equipment could be suspended from the aircraft by rigid struts, in place of the pod, using expendable plastic fairing for streamlining.

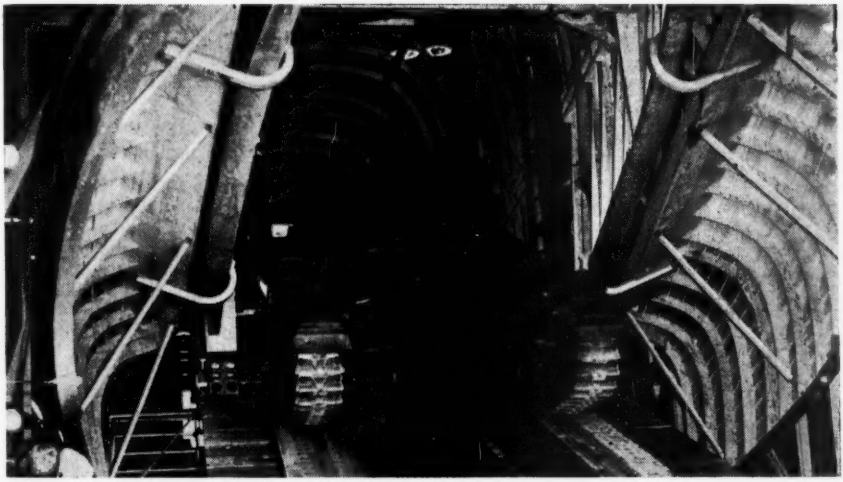
Further development along these lines will be rapid and impressive, for these aircraft will be as valuable for commercial cargo and passenger operations in peacetime as they will be for military operations in time of war.

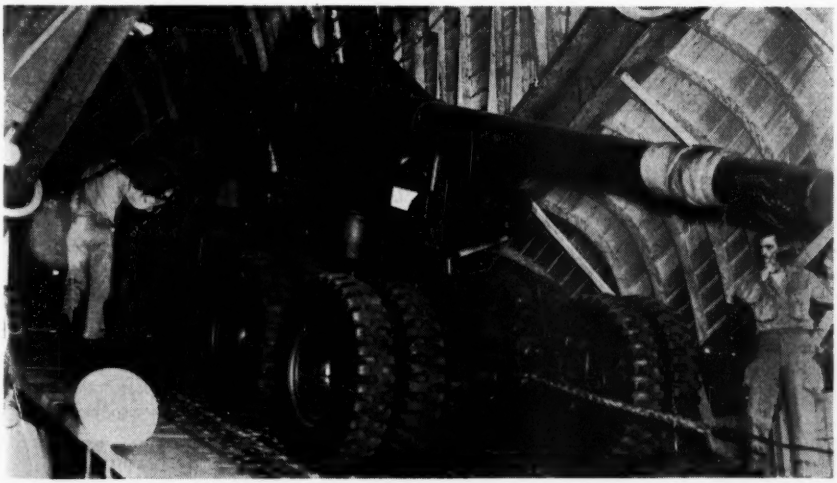
it may be quickly converted to war production.

Army Contributions

Supplementing these developments engineered by the United States Air Force and the American aircraft industry, the Army has not been idle. Notably, Army Ordnance has fathered a new, light-weight air-cooled engine which will have a direct effect on increasing the airtransportability of bulky Army vehicles.

This engine weighs only one-third as





The problem of moving the heavier equipment of the infantry division by air is being met in part by the use of heavy transport planes, such as the C-124, which can accommodate nearly all equipment of a field army. Above, an M-24 light tank being unloaded from a C-124; below, unloading a 155-mm gun.—US Air Force photos.

much as liquid-cooled motors of equal horsepower. Made in four, six, eight, or twelve cylinders, with interchangeable parts, an eight-cylinder motor weighing eight hundred and sixty pounds develops two hundred and fifty horsepower. It takes up little more space than the radiator and fan of a liquid-cooled engine of comparable horsepower.

This weight-saving alone, in combat vehicles, will increase airtransportability of the infantry division to a remarkable degree. In trucks and tractors, it will reduce both weight and over-all length, with an important effect on dimensions as they affect airtransportability.

Other Army research and development projects similarly seek end products which will show weight-size savings without sacrifice of efficiency, durability, or firepower. This mutual effort on the part of the Army, Air Force, and American industry will certainly, before long, result in reaching the goal of a wholly airtransportable infantry division.

This goal is not being pursued to the exclusion of the present airborne division. Its realization would make the airborne division even more effective, placing it upon its objective with vastly increased firepower and transport. An airhead operation of the future, involving a field army, might include an airborne corps of three or more parachute divisions, as a spearhead, followed by one or more standard corps, airtransported.

When, in a recent magazine article, I stated that Army Field Forces' present planning embraced airhead operations on field army scale, it was believed by some that such planning was too ambitious, that even if we could succeed in placing an entire army on an objective to which the sole line of communication was by air, the logistics of resupply would be insuperable.

Airlift Experience

After the achievement of the United States and Royal Air Forces in Operation *Vittles*, this objection can hardly be re-raised. This magnificent undertaking has been successful in supplying essentials of food and fuel to nearly two and one-half million people—more than the population of Philadelphia—over a period of months.

The Air Force is making available to Army Field Forces its records, statistics, studies, and findings on this operation and they are being examined and applied to the problems which might be expected to arise in a similar military situation.

In this connection, it is interesting to note that the British are flying naval aircraft into Berlin, and the United States Navy is employing its great transports in support of the operation. It is not improbable that in future planning of airtransported operations, cooperation on the part of the United States Navy may complement the present Army-Air Force alliance. There is no convention which says that an airhead may not be established on the shores of an inland sea, nor one which prohibits extension of the range of assault transports and troop carrier aircraft, as well as bombers, by having them take off from the decks of giant airplane carriers.

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may 1949

Large and powerful air forces alone do not constitute "air power." Only by employment of air forces in concert with land and sea forces can there be such a thing as "air power."

General Omar N. Bradley

The Japanese Threat to Australia

Samuel Milner
Historical Division, Department of the Army, Special Staff

This article is a condensation of a chapter in the volume Port Moresby to the Admiralties, *one of eleven books on* The War in the Pacific *which form a part of the series,* U.S. ARMY IN WORLD WAR II *being produced by the Historical Division, Department of the Army, Special Staff.—The Editor.*

PRIOR to the opening of the Pacific war, the Australians had relied upon the British forces in Malaya, the base at Singapore, and the British Eastern Fleet to hold the Japanese should the latter attack. They had sent troops to bolster the British position in Malaya before the Japanese struck, and, in January 1942, joined with other Allied governments in the Far East in the establishment of the Australian, British, Dutch, American Command (ABDACOM), under the supreme command of General Sir Archibald P. Wavell of the British Army. The principal mission of ABDACOM was to hold the Malay barrier, the line Malay Peninsula-Sumatra-Java-northern Australia. If possible, it was to reestablish communications with General Douglas MacArthur's beleaguered forces in the Philippines. Australia, which was already being used as an Allied communications zone, was to be held "as an essential supporting position." In practice, this meant that all available Allied resources (including American troops and aircraft then being assembled in Australia) were assigned to General Wavell for defense of the barrier, while Australia itself was left to the Australians to defend as best they could from their own limited resources. Meanwhile, with the entire strength of ABDACOM committed to the area northwest of Australia, the Japanese struck at the weak Australian defense perimeter to the northeast of the Continent, and quickly entrenched themselves there. Ironically enough, the real danger to Australia was to come not from the area to the northwest, which ABDACOM tried so strenuously to hold, but from that to the northeast, which the Japanese were able to take from the Australians at trifling cost.

Danger from the Northeast

By December 1941, Australia, a country of only a little over seven million people, had already been at war for more than two years. Loyally joining the mother country in the fight against the European Axis, she had dispersed her land, air, and naval strength around the world. When the Japanese struck, three well-trained, well-equipped infantry divisions of the Australian Imperial Forces (AIF),

By frustrating Japanese attempts to take Port Moresby and sever the line of communications, the Allies removed the threat to Australia, which became a mighty base for offensive operations in the Pacific

the overseas volunteer force, were in the Middle East; six squadrons of the Royal Australian Air Force and 8,800 other Australians were serving with the British there and in the United Kingdom. Major units of the Royal Australian Navy, which then consisted principally of two heavy and two light cruisers, were serving with the Royal Navy in the Mediterranean. Two AIF infantry brigades, a machine gun battalion, and three squadrons of the RAAF, were in Malaya. Two battalions of the AIF were in the Netherlands East Indies supporting the Dutch. Only a small portion of Australia's trained combat strength was left to guard the mainland and its northeasterly approaches.

Australia's Home Defenses

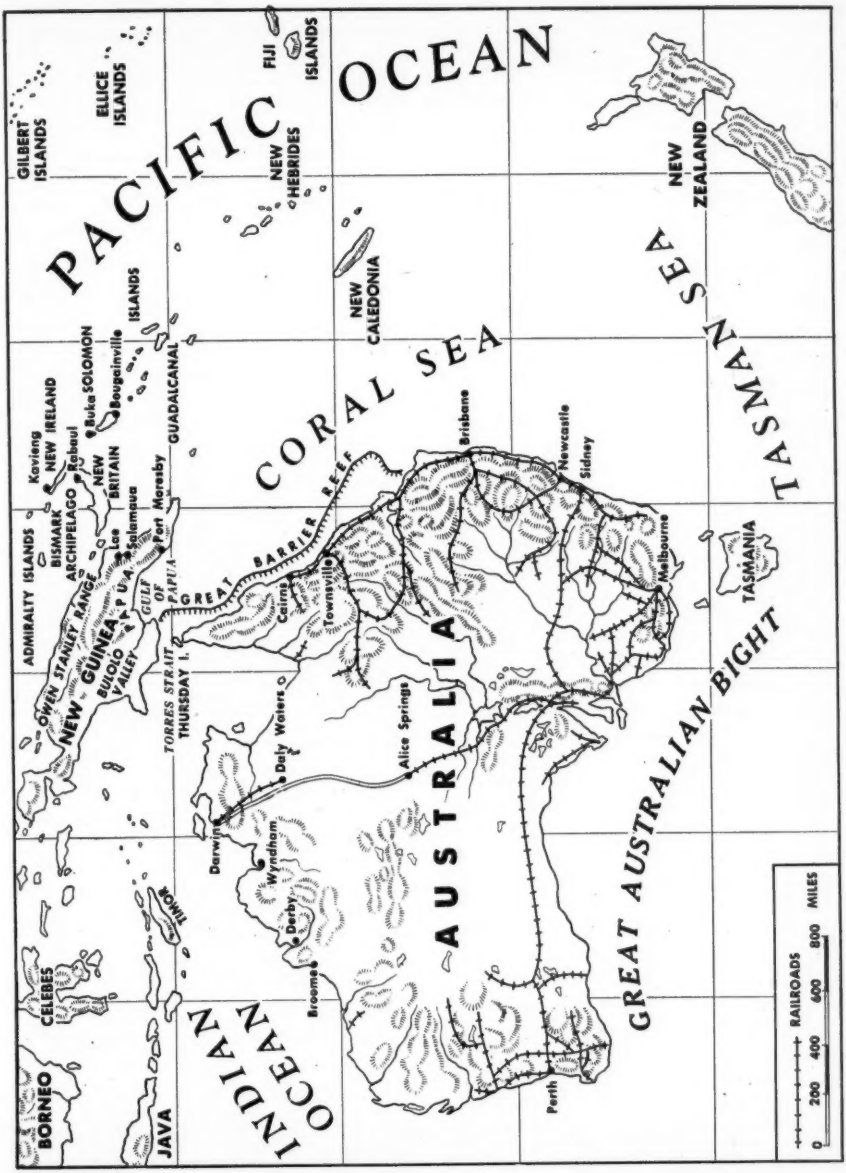
Australia's home defenses were in a truly desperate state. Most of the 165 aircraft which it had in the Pacific when the Japanese struck were in Malaya. The total bombing force available for Australia's defense consisted of 29 Hudson medium bombers and 14 Catalina flying boats, 43 aircraft in all. As Australia's only fighter-type planes (obsolete Brewster Buffaloes) were in Malaya, the RAAF had to rely for fighter operations on the Australian-built Wirraway, a type of advance trainer useless in combat.

Other than training cadres, there were very few trained troops left in Australia. Such units of the AIF as were still to be found in Australia (including an armored division without tanks) were for the most part recruit formations.

Australia's home defense organization, the Australian Military Forces (AMF), had two components: the Permanent Forces or regular army (28,000 men in September 1939); and the Citizen Military Forces (CMF), the conscripted home defense force, then liable only for service in Australia and Papua. It had been planned to maintain the militia at a strength of 250,000 men, but, until the Japanese struck, only half of them were called up at any one time. The basis of call was "three months up, and three months down"—three months in camp, and three months at home. This scheme was designed to insure that a force of at least 125,000 men was always on hand to meet a sudden Japanese attack, without at the same time robbing Australia's over-taxed war industry of men it could ill afford to lose. The AMF, which had very early lost many of its best officers to the AIF, was very poorly armed; and, until February 1942, did not even have its minimum quota of small arms, let alone field equipment. It was organized into seven militia divisions, but these were only training units with constantly changing personnel which did not begin full-time training until late January and early February 1942, when the full mobilization of the CMF was finally completed.

An organized reserve of about 50,000 men, the Volunteer Defence Corps (VDC), was also available for defense of the mainland. Made up principally of veterans of World War I who served in their home districts on part time basis without pay, the VDC was even more poorly equipped than the AMF, and at the outset had to use whatever weapons were at hand, including single-shot rifles, and other even more antiquated weapons.

It was clear to the Australian Chiefs of Staff that with untrained, ill-equipped troops, a critical lack of aircraft, and insufficient naval forces, an effective defense of the forward bases to the northeast was impossible. Additional troops committed to their reinforcement would probably be lost, and the only result would be to reduce by that much the forces available for the final defense of the mainland. The Chiefs of Staff therefore recommended to the Australian War Cabinet on 15 December that the existing garrison at Rabaul, New Britain, the main Australian base in the Bismarck Archi-


PACIFIC OCEAN
CORAL SEA
TASMAN SEA
GREAT AUSTRALIAN BIGHT
INDIAN OCEAN
AUSTRALIA
NEW GUINEA
PAPUA
GULF OF PAPUA
GREAT BARRIER REEF
TORRES STRAIT
THURSDAY I.
ADMIRALTY ISLANDS
BISMARK ARCHIPELAGO
NEW IRELAND
Kavieng
Rabaul
NEW BRITAIN
Lae
Salamaua
Port Moresby
OWEN STANLEY RANGE
BUIOLO VALLEY
SOLOMON ISLANDS
Buka
Bougainville
GUADALCANAL
GILBERT ISLANDS
ELLICE ISLANDS
FIJI ISLANDS
NEW HEBRIDES
NEW CALEDONIA
NEW ZEALAND
TASMANIA
BORNEO
CELEBES
JAVA
TIMOR
Darwin
Daly Waters
Wyndham
Derby
Broome
Alice Springs
Townsville
Cairns
Brisbane
Newcastle
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Melbourne
Perth
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pelago, and other garrisons forward of Rabaul, be neither withdrawn nor increased, and that the garrison at Port Moresby (which in their opinion had some chance of survival because of its more favorable geographic location) be increased from a battalion to a brigade group, the largest force which could be maintained there out of Australia's limited resources. The rest of Australia's available manpower and resources were to be concentrated on the mainland, on the assumption that there was no choice, as matters stood, but to make the real fight for Australia in Australia itself.

It was obvious that Australia's defense would be extremely difficult. Its area is vast, almost equal to that of the United States. It has a 12,000 mile coastline, and its only transcontinental railroad, that from Cairns to Perth, skirts the coast and could be cut readily by a landing from the sea. Railroad movement was slow, averaging 15 to 18 miles per hour. Trackage, which was of five different gauges, caused hours of waiting at every state boundary for the trans-shipment of freight. Roads and bridges were of light construction, and ferries, rather than bridges, were to be found at many important river crossings. Australia's central desert region possessed only the most tenuous of communications. A north-south defense highway between the interior railheads at Daly Waters and Alice Springs, which connected Darwin with the rest of Australia, was unfinished and virtually useless in wet weather.

Because of the lack of adequate road and rail communications, a relatively static local defense of the country's most vital areas was adopted. A mobile reserve in each military district or command was expected to give a certain amount of flexibility to this defense.

The main concentration of forces was in the vital Brisbane-Newcastle-Sydney-Melbourne area, the industrial and agricultural heart of Australia. Smaller forces were placed on duty in Southern Australia, Western Australia, and Tasmania. Independent garrisons were established at Darwin, Townsville, Cairns, and Thursday Island in Torres Strait. Except for the dispatch of a reinforced battalion to Port Moresby in January, the garrisons in the northeast forward area were left to fend for themselves.

The Defense of the Northeast Area

The northeastern defense perimeter, known as the Northeast Area, included Papua, the Mandated Territory of New Guinea (Northeast New Guinea, New Britain, New Ireland, the Admiralties, Buka, and Bougainville), and the southern, or British, Solomons. Except for three key positions—Port Moresby in Papua, the Bulolo Valley in Northeast New Guinea, and Rabaul in New Britain—the Northeast Area was beyond the means of the Australians even to attempt to defend.

Port Moresby, the capital of Papua, was the most important of these key positions. It covered the all-important Brisbane-Melbourne area and was thus the key to Australia itself. A small, tropical port on the Gulf of Papua, with a single wharf, Port Moresby had been known principally for its copra trade. Although the rest of New Guinea was extremely wet, little rain fell in the Port Moresby area. Port Moresby's two air fields were both in a rudimentary state. The small airstrip at Kila Kila Aerodrome, just outside town, was useless for military traffic. Seven Mile Aerodrome was little more than a levelled-off clearing in the bush, a bare beginning on what was required for successful air operations.

Though Port Moresby lay at the foot of the towering Owen Stanley Mountain Range, and was thus afforded protection from overland assault, it was open to attack from sea, and its exposed supply line from northeast Australia could be cut by

naval and air action. The garrison consisted principally of the 30th Infantry Brigade Group, AMF, which, with the arrival of the promised reinforcements in January, totalled about 3,000 men. In support were a 6-inch coastal battery, an antitank battery, a 3.7-inch antiaircraft battery, and a handful of Catalinas and Hudsons. There were no fighters, not even Wirraways.

The 3,000-foot high Bulolo Valley was held by the New Guinea Volunteer Reserve (NGVR), a local militia recruited in Papua and the territories of the Mandate. Wau, a small, and inaccessible gold-mining town high in the mountains, from which a network of native trails led down directly to Salamaua, was the key to the Valley's defense. Wau had a good air field, and with its two neighbors, Bulolo and Bulwa, could also be supplied overland via the Lakekamu River-Bulldog-Kudjeru trail, an uneconomical route which rose at one point to 9,000 feet and could be traversed only with the greatest difficulty by canoe and on foot.

The NGVR was permanently mobilized on 21 January 1942. Its strength in the Bulolo Valley was about 500 men, who were given the task of keeping watch over Lae, Salamaua, and nearby coastal points. Should the Japanese occupy Lae and Salamaua, they were to hold the Bulolo Valley and to use it as a base from which to harry the invaders until time to drive them out.

Rabaul, a fine seaport in the Bismarck Archipelago, had excellent potentialities as a major base of operations, but the Australians, who had taken the place from the Germans during World War I, had done little to develop them. The Australians did, however, build a small coastal fort at Praed Point, and two air fields, a fighter strip at Lakunai, and a bomber strip at Vunakanau. The garrison consisted of the 2/22d Battalion of the 8th Division, AIF, a 100-man formation of the NGVR, a small detachment of the RAAF, and a few officers of the Royal Australian Navy—altogether 1,400 men. Coastal defense was provided by two discarded 6-inch naval guns; antiaircraft defense by two 3-inch guns (with defective sights); and air support by seven Wirraways and a few Hudsons.

The rest of the Northeast Area was held by the 1st AIF Independent Company (less one platoon), a force of about 300 men. Detachments of the company were stationed at Lorengau in the Admiralties; Kavieng in New Ireland; and at Buka and Tanambogo in the Solomons, where there were also a few RAAF Catalinas and some RAAF personnel. In addition, a part of the company's strength was to be found at Vila, in the New Hebrides.

Also stationed at strategic points in the Northeast Area were the Coast Watchers. Usually long-time residents of the areas which they were to keep under surveillance, it would be their duty to remain behind when the Japanese came, and to report on enemy movements by radio. The Coast Watchers, who had long prepared for the task, did not have long to wait.

The Fall of Rabaul

By the end of December 1941, Japanese four-engine flying boats had thoroughly reconnoitered the Bismarck Archipelago, and the Lae-Salamaua area. Beginning 4 January, flying boats and carrier aircraft hit Rabaul repeatedly, forcing the Hudsons to withdraw to Australia. On 20 January, all the Wirraways were shot down by 100 carrier planes. A day later, Rabaul's only coastal battery was literally blown out of the ground by dive-bombers. The stage was set for the capture of Rabaul.

The Japanese force chosen to take Rabaul was the same force that had taken Guam. Known as the *South Seas Detachment* or *Nankai Shitai*, it was essentially a regimental combat team consisting of the

144th Infantry Regiment and supporting troops, altogether 5,000 men. It was under command of Major General Tomitaro Horii, an experienced general officer, who had previously been in command of the *55th Division Infantry Group*, from whose headquarters his staff had been drawn.

On 4 January, *Imperial General Headquarters* ordered General Horii to proceed with the capture of Rabaul. The operation was to be undertaken as soon as possible after 15 January. The Commander in Chief of *4th Fleet*, Vice Admiral Nariyoshi Inouye, was ordered to support the operation, and simultaneously with the capture of Rabaul, to capture Kavieng. On 8 January, after concluding an agreement with Admiral Inouye as to the fleet's part in the operation, General Horii issued orders for the Rabaul operation; D-day was to be 23 January and the landings were to begin an hour and a half before dawn.

The detachment, heavily reinforced by pioneer troops, left Guam for Rabaul on 16 January, escorted by units of the *4th Fleet*. The convoy was joined off Truk by the naval task force which was to take Kavieng, and the combined force, an armada of some 40 ships including cruisers, destroyers, and at least two aircraft carriers, headed from Truk directly for the Bismarcks.

The special naval landing forces detached to take Kavieng and points in its immediate vicinity met with no opposition. The small Kavieng garrison which sought, at the last moment, to escape in small boats, was captured intact when it came under the guns of a Japanese destroyer.

The main body of the invasion convoy arrived off Rabaul on the night of 22-23 January. After first sending naval landing parties to occupy the nearby Duke of York Islands, the *Nankai Shitai* began to land on the western shores of Karavia Bay and Simpson Harbor at the appointed time before dawn. The Australians, who had only mortars and machine guns, resisted stoutly and, for a time, held up the landing. But when daylight came and they saw the array of ships in the harbor and realized that they were hopelessly outnumbered and almost surrounded, they abandoned their positions. Some fought to the death; others took to the hills. Of the latter, more than 400 managed to elude the Japanese and to reach the south coast of New Britain. There, other Australians took them to safety in small boats.

With the Japanese capture of Rabaul, the forward defense of the Northeast Area fell apart. All that was left of it was the garrison at Port Moresby, the NGVR units in the Bulolo Valley, and a handful of troops in the Admiralties and the Solomons, who were prepared to leave or "go bush" at a moment's notice.

The Japanese had gained a great strategic prize when they took Rabaul. Truk, Palau, and Davao, main Japanese supply bases, were respectively 800, 1,500, and 2,000 miles away, and Japan itself was only 3,000 miles from Rabaul, in contrast with the 7,000 odd miles between San Francisco and Brisbane. Rabaul was within bombing distance of Port Moresby. With intermediate landing fields readily available, the Japanese could easily bring it under fighter attack. Buka, the nearest island in the Solomons group, was within fighter range. By spacing air fields at intervals through the group to the southern Solomons, the Japanese could bring their aircraft within striking distance of the Allied communications line to Australia southward of the Solomons.

The Japanese, who had brought a large pioneer force to Rabaul in the invasion convoy, lost no time in developing the place into a major base of operations. Existing air fields were extended, and new ones built; the harbor was improved, and a naval air station developed which had few equals in the empire. It quickly

became clear to the Allies that as long as the Japanese at Rabaul were able freely to receive troops and supplies from points in the Japanese empire and land them in New Guinea and the Solomons, neither Australia nor its line of communications with the United States could be considered secure. Rabaul, in short, was the key to Japanese offensive action in the South and Southwest Pacific, and all Allied strategy and planning for those areas would have to take due cognizance of that fact.

The most immediate danger was to Port Moresby. Had the Japanese attempted to take it immediately after the capture of Rabaul, they undoubtedly would have succeeded. Fortunately for its garrison and for Australia, the Japanese did not make the attempt at that time.

The Gathering Storm

General Wavell was unable to provide for Port Moresby's defense and, indeed, soon found himself unable to hold the barrier with the resources at hand. On 15 January, the Malay campaign came to an end with the surrender of Singapore. Ten days later, ABDACOM was dissolved. General Wavell was recalled to India, and the command of the Indies area reverted to the Dutch, whose hopeless last-ditch resistance in Java the Japanese were able to overcome in short order. It was now clear that the Australians and Americans between them would have to save Australia. Mr. John Curtin, the Australian Prime Minister, had told his people in late December that Australia would have to look to the United States if it was to have "some confidence of being able to hold out." What he had then foreseen so clearly had come to pass.

ANZAC Force

The first joint effort of the United States and Australia to safeguard Australia's northeastern approaches came shortly after the fall of Rabaul. On 29 January, the Combined Chiefs of Staff established the ANZAC Area, a new strategic area. It covered the ocean reaches between New Caledonia, Australia, and New Zealand, and included the Tasman Sea, the Coral Sea, and the waters of the Northeast Area, the southern Solomons, and the new Hebrides. The ANZAC Area was to be under United States naval command, and an ANZAC Force was to be established under an American flag officer, who was to operate directly under the Commander in Chief of the United States Fleet, Admiral Ernest J. King. The mission of ANZAC Force was to cover the eastern and northeastern approaches to Australia and New Zealand. It was to protect shipping, support the defense of key islands in the area, attack enemy-held positions therein, and correlate its operations with those of ABDACOM and the United States Pacific Fleet.

ANZAC Force—the Australian cruisers *Australia*, *Canberra*, and *Hobart*, the US cruiser *Chicago*, four US and Australian destroyers, and a few Australian corvettes—was placed under command of Vice Admiral Herbert F. Leary, USN, on 7 February. To assist ANZAC Force in the discharge of its duties, a squadron of naval patrol bombers was to be based at Noumea, New Caledonia, and a squadron of B-17s, detached from the Hawaiian Air Force, at Townsville. The B-17s reached Townsville on 17-18 February, and flew their first missions against Rabaul several days later, thus earning the distinction of being the first United States planes to strike at Rabaul. Naval task forces built around the three carriers of the Pacific Fleet—the *Enterprise*, the *Lexington*, and the *Yorktown*—were also available to help break up gathering Japanese concentrations in the area, and, as opportunity presented, to reduce the enemy fleet by defeating it in detail.

Port Moresby's real protection at this

time lay not in its weak and dispirited garrison, or its dwindling bomber force, which by mid-February was down to five Catalinas, but in the fleet units and B-17s of ANZAC Force, and such warships as the US Pacific Fleet could make available in the Coral Sea for its defense. A seaborne invasion attempt directed at Port Moresby would have to reckon first with Allied fleet units in the ANZAC Area. Should the Japanese evade or defeat them, Port Moresby's fate would be sealed, as its garrison was in no position to oppose a full-scale enemy landing attempt.

The Japanese Plan of 2 February

With both Rabaul and the Indies in Japanese hands, Australia was in imminent danger of invasion both from the northeast and the northwest. The danger seemed particularly pressing from the northwest. Following a heavy carrier raid on Darwin on 19 February, the Japanese mounted heavy air attacks upon Broome, Wyndham, and other points in the Northern Territory in early March. Although they were thus implementing their original plan, which called merely for the harrying of the northwest coast, the diversion was entirely successful, since it caused the Allies to prepare for an invasion from that quarter. Lieutenant General George H. Brett, Commanding General of US Army forces in Australia, and previously Deputy Commander of ABDACOM, was convinced that the Japanese would make their main invasion attempt from the northwest. They had large concentrations of troops, planes, and naval forces, including carriers, in the Indies, and could, if they chose, turn them against Darwin at a moment's notice.

The Australian Chiefs of Staff took a contrary view; the real threat, they thought, lay elsewhere. On 5 March, they concluded that if the Japanese bothered to take Darwin at all, it would be rather to prevent its use by the Allies as a "springboard" to attack them than to use it as a "stepping stone" for the invasion of Australia. The main object of the Japanese, as they saw it, was "to cut the air and shipping lines of communication between the United States and Australia, with a view to preventing the development of Australia as a base for eventual offensive operations." They thought the Japanese could best achieve this aim by the occupation of New Caledonia and Fiji. However, as Port Moresby threatened their lines of communication, they thought it natural that the Japanese would act to eliminate that threat first. They could see no reason, therefore, why the Japanese should not attack Port Moresby immediately, provided they were prepared to run the risk of meeting the naval units of ANZAC Force and units available to it from the US Pacific Fleet. Should the Japanese choose to attack New Caledonia first, their lines of communication would be longer, and their risk of encountering ANZAC units and reinforcements from the Pacific Fleet would be correspondingly greater; not only that, but Port Moresby would be left as a hostile base on their flank. For that reason, they thought Port Moresby would be attacked first; New Caledonia, four to six weeks afterward.

The Australian Chiefs of Staff showed remarkable prescience in their estimate of Japanese intentions. Following the capture of Rabaul, the *Army* and *Navy Sections* of *Japanese Imperial General Headquarters* debated what their strategy should be with regard to Australia. The discussion was animated, and the representatives of the Army and Navy found themselves initially in complete disagreement as to the proper course of action.

The *Navy Section* pointed to an ominous increase in air and sea activity between the United States and Australia as evidence that Australia was to be used as a base for counteroffensive operations, and urged that the Australian mainland be seized, whatever the cost. The repre-

sentatives of the Army, though equally perturbed by the prospect that Australia might be used to mount counteroffensives against them, were strongly opposed to invasion because it would require ten or more divisions to seize and hold Australia, and they did not have the "munitions" or "reinforcements" for such an operation. The Army's view prevailed. Instead of an operation against the mainland, it was agreed without further discussion to seize Port Moresby, and following that, "to isolate Australia by severing the communications line between the United States and Australia, by occupying Fiji, Samoa, and New Caledonia." The strategy was clear: The isolation of Australia would be achieved without invasion, and at much less cost.

On 2 February, as an essential preliminary to the Port Moresby operation, *Imperial General Headquarters* ordered the *South Seas Detachment* and the *4th Fleet* to take Lae and Salamaua, and, at the proper time, Port Moresby. The *4th Fleet*, preparatory to offensive action against Fiji, Samoa, and New Caledonia, was meanwhile to seize key positions in the Solomons, including Tulagi. The operations against Port Moresby were to be completed first; action against the bases of the communications line was to follow immediately thereafter. On 16 February, General Horii and Admiral Inouye concluded an agreement for joint operations against Lae and Salamaua. It was agreed by the two commanders that Navy troops were to take Lae, and Army troops, Salamaua. The Navy was to supply the garrison for both points.

The landing, tentatively set to take place before the end of the month, was delayed. The US carrier *Lexington* and a protecting force of four heavy cruisers and ten destroyers had, meanwhile, moved into the area with orders to break up the enemy concentrations at Rabaul in concert with the ANZAC B-17s at Townsville. Japanese reconnaissance had detected the *Lexington* force while it was still some 350 miles from Rabaul. After a running fight which cost the Japanese 18 bombers, the carrier force, which had run short of oil, withdrew. The B-17s did mount an attack against Rabaul two days later, the first blow by the Americans against that base. The clash with the *Lexington* force upset the Japanese time table for the Lae-Salamaua operation, and D-day, as a result, was postponed to 8 March.

Occupation of Lae and Salamaua

Japanese naval aviation had been bombing Port Moresby from Rabaul since 3 February. On 8 February, when the Japanese occupied Gasmata, an island off the south coast of New Britain, they acquired a good fighter strip, 185 miles from Rabaul, and 200 from Lae-Salamaua. They were thus in position to give effective land-based air support to the Lae-Salamaua landings, and to stage fighters from Rabaul to the air field at Lae (larger and better than that at Salamaua) immediately the area was taken. Heavy air attacks upon Lae, Salamaua, Port Moresby, Wau, and Bulolo, which began on 2 March, preceded the operation. The forces chosen to make the landings were the *2d Battalion, 144th Infantry*, of the *South Seas Detachment*, which, with supporting troops, was to take Salamaua, and several companies of the *Maizuru 2d Special Naval Landing Force* from Truk, which were to take Lae. The combat troops, about 1,500 men, were to be accompanied by the *7th Base Corps*, a naval unit about 1,500 strong, which was to be the garrison force. Both the *144th Infantry*, and the *Maizuru 2d* troops were to return to their parent organization at Rabaul and Truk when the area was secured.

The convoy, which included at least three cruisers, eight destroyers, and several transports and cargo ships, left Rabaul on the night of 5 March, and made

for New Guinea along the south coast of New Britain. Fighter planes, staging through Gasmata from Rabaul, brushed off feeble Australian sorties from Port Moresby, and the convoy reached the Huon Gulf without loss before midnight on 7 March. At one minute past midnight, the *2d Battalion, 144th Infantry,* made a completely unopposed night landing at Salamaua, and by 0200 had occupied the town, the air field, and the wireless station. As soon as daylight came, the *Maizuru* troops occupied Lae, 18 miles to the north. They too met with no opposition as the NGVR, after putting both Lae and Salamaua to the torch, withdrew to the Bulolo Valley, leaving only light patrols behind. Two days later, the first fighter planes from Rabaul landed at Lae and work was begun at once to turn it into a large naval air station.

Attempts the next day by a flight of ANZAC Force B-17s to prevent the Japanese from consolidating their newly-won positions were ineffective. The landing forces, however, were not to go completely unscathed. Following the abortive attempt of the *Lexington* to raid Rabaul in late February, a larger carrier force, comprising the *Lexington* and the *Yorktown,* supported by eight heavy cruisers and fourteen destroyers (some of them from ANZAC force) was assembled in early March to complete the mission. The Huon Gulf landings, which the carrier forces might have prevented had they struck earlier, caused an immediate change in plan. On 10 March, 104 carrier planes took off from the *Lexington* and the *Yorktown,* which were then in the Gulf of Papua, flew through a pass in the Owen Stanley Mountains, and struck at the enemy concentrations on the Huon Gulf. The bombing was accurate and four ships, a converted light cruiser, a minesweeper, a transport, and a cargo ship, were sunk, and 50 men of the *Maizuru* unit at Lae were killed. A day later, eight ANZAC B-17s attacked the target area and did considerable damage to buildings, runways, and piers. The air attacks of 10 and 11 March, though successful beyond all expectation, did not seriously impede the efforts of the Japanese to establish themselves on the Huon Gulf. By 13 March, the area was considered secure. The *7th Base Corps* took over from the combat forces, and the latter returned to Rabaul that day, reaching it safely on the 15th.

Their investiture of the Huon Gulf area gave the Japanese a sheltered fleet anchorage at Salamaua, air fields there and at Lae, and a strong flanking position at Finschhafen, 60 miles northeast of Lae, which they could garrison at their leisure. Japanese naval aviation was now within 170 air miles of Port Moresby, and 50 from its forward outpost, Wau. The way was clear for the next phase of operations: the seizure of Port Moresby itself.

No sooner had the Japanese come within close fighter range of Port Moresby than, in accordance with the plan of 2 February, they began also to expand into the Solomons. As early as 13 March, they sent a force from Rabaul to occupy nearby Buka, and, by the end of the month, had taken up other positions in the northern Solomons. The next step was to seize the southern Solomons. The final step, which was to follow the seizure of Port Moresby, would be the capture of New Caledonia, Fiji, and Samoa, in order to sever the line of communications between the United States and Australia.

The Japanese plan failed. The Allies frustrated it completely by defeating Japanese attempts both to take Port Moresby and to sever the line of communications. The threat to Australia was removed, and Australia itself, as the Japanese had feared, became a mighty base for offensive operations which contributed substantially to final victory in the Pacific.

A Survey of Air Power

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PRACTICALLY every advance made in the profession of arms has been a stormy center of controversy until such time as its role in war has become universally accepted and understood. The evolution of air power, from a novelty and challenging faith of an adventurous few to its present-day status of dominance, followed the same rocky path which every major innovation has had to travel. Behind every new concept there must be a man of genius to see the latent possibilities in an instrument which most men ignore. Douhet was the first high priest of air power, the man who saw within the powered kites of 1918 the great air fleets which roared over Europe and Asia in 1945.

After the prophet come the disciples—men willing to stake their reputations on their belief that the seer was right. Such men, the disciples of Douhet, served in the military forces of every major power between the wars. Each sought to convince the established military forces that a new master stalked the field of Mars.

Douhet's ideas were put to test after 1939, but since the war was not necessarily a gigantic laboratory, the demonstration of Douhet's principles was not complete. Yet, as the result of World War II, one conclusion with regard to air power has been established: Air superiority is vital to the success of any military operation.

Every soldier and sailor has gained a keen appreciation of the significance of air power on the modern battlefield. They realize that air power has become the eyes and the strong right arm of all surface forces, which, in turn, form the platform from which air power springs.

During the period of aviation adolescence, many of Douhet's disciples devoted themselves wholeheartedly to developing the air arm as support for surface forces. But now that the air fledgling has grown to full stature, airmen have become enamored once more with Douhet's first principle: "Command of the air is a necessary and sufficient condition for victory."

This concept is uppermost in the minds of the men who control most of the major air forces in the world, our own included. As there is a limit to the total amount of air power a nation can support, the implementation of this concept will have serious repercussions on other military forces. Air power devoted to Douhet's first concept will not be available to support the operations of surface forces, for men who believe that air power can

The role of air power, with its tremendous capabilities and serious limitations, is not the exclusive concern of airmen; its relation to national policy is the proper study of all who serve their nation

bring about the enemy's capitulation by direct action against his vital points will not be inclined to waste planes and men on what they consider an archaic form of warfare.

Douhet's theory of air power was not given a complete test in World War II. Consequently, there is no way of deciding in advance whether air power alone can live up to Douhet's claims when directed against a massive, continental power. Grounds for reasonable doubt remain, and these should be known and critically analyzed. Only thus can the services merge their roles into a unified support of national policy, for under no contemplated employment will air power become totally independent of the cooperative assistance of ground and naval forces. Just as an army cannot operate in the stratosphere and a navy is unable to function in the middle of a desert, an Air Force is bound by certain limitations. An analysis of the strength and weaknesses of air power gives a better realization of the interdependence of the armed forces in combat. This analysis must begin with the consideration of the airplane, which is the instrument of air power.

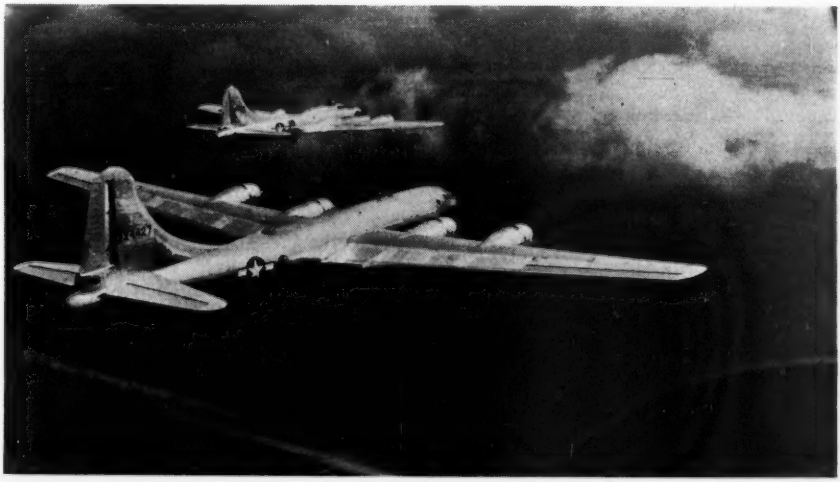
The Plane

The modern airplane dominates warfare. The key to this domination lies in the unique combination of great mobility and firepower, uninhibited by geographical barriers. Moving in the third dimension, the airplane gives to the airman the tactical advantage of height, which has always been so bitterly contested in ground warfare. A realization of a bomber plane's firepower can be gained from the fact that a 22,000 pound block-buster is the equivalent of a broadside from a battleship. Likewise the fighter pilot commands more 50 caliber machine-gun bullets with his trigger finger than does the individual fighting man of an army.

In speed, the airplane is beginning to penetrate the once-forbidden barriers of the velocity of sound. In range, the airman speaks of hundreds of miles as calmly as the artilleryman discusses the range of a gun in thousands of yards. Yet, compared to the gun, the bomber is inaccurate. The airplane has an inherent flexibility which permits it to mass quickly over any target within range and then to disperse to widely separated bases. It can move, hit, and guard in rapid sequence. The plane also enjoys remarkable versatility: it supplies intelligence, it facilitates command and liaison, it serves as a means of rapid transportation. With all these attributes, one is tempted to ask: Is this the final weapon, invincible and invulnerable?

Like all works of man, the airplane has its share of limitations. Gertrude Stein might describe the chief weaknesses of aircraft by saying that "the airplane is an airplane," for all capabilities of the airplane evaporate as soon as it touches earth. Once on the ground the airplane is, for military purposes, in much the same predicament as a fish out of water. It has no speed, no mobility, no range, and no practical firepower. And while the plane has all these factors in abundance once in the air, its lease on air space is short, expensive, and subject to innumerable breaches of contract. Air power must pay an exorbitant price to gravity in the form of costly fuels and limited carrying capacity, before it can even move into air space. In the air, the airplane is subject to all sorts of dangers; mechanical weaknesses or pilot errors may mean destruction. Consequently, the burden of aircraft maintenance and pilot training and selection is heavier with an air force than are the corresponding problems in surface forces. Likewise, the airplane is highly vulnerable to enemy action and promises to become increasingly so as ground-to-air guided missiles are further developed.

It was Douhet, the "first high priest of air power," who saw in the "powered kites of 1918 great air fleets which roared over Europe and Asia in 1945." Above, a Curtiss JN4H, a plane of the World War I period; below, Boeing B-29s, which played such an effective role in reducing the enemy's potential to make war in World War II.—US Air Force photos.



The airplane is still sensitive to weather, although tremendous strides have been made to overcome this handicap. Air and ground-controlled radars now permit landings, take-offs and flying in the face of weather conditions which even a year ago would have been regarded as impossible. Poor weather over the target, once considered a drawback, is now regarded as a boon to the application of strategic air power.

The time that an airplane is actually in fighting contact with the enemy is very short. The plane is a one-punch performer; once the order "Bombs Away" is given, the bomber ceases to be a fighting machine and becomes a transport plane capable of self-defense for only a limited period. This emphasizes the fact that, unlike an infantry division or a battleship, the plane is not capable of sustained combat. Yet the shock which an air force can deliver with one blow may be more dangerous than an equal explosive force delivered in smaller packets over a longer period of time.

To compensate for this limitation, it is desirable to employ aircraft in great numbers, so that the power of many individual aircraft can be combined into a mighty, sustained striking force.

Logistics of Air Power

With the advent of the modern era of warfare, and the acceptance of the nation-in-arms concept, the cost of wars has soared beyond the comprehension of most of those who fight them and pay for them. Air power tops the parade of military inflation. During the 1948-1949 fiscal year, more than half of the American defense budget will be spent on either the Naval air arm or the Air Force. Every advance in aviation design means more complications and more expense. Heavy bombers—vulnerable though they are—cost in the millions; fighter aircraft cost hundreds of thousands. Moreover, while the obsolescence rate of a field artillery piece is relatively low, that of all aircraft is relatively high. The training of competent air crews is likewise the most expensive of military training. These factors taken together reveal why the operation of the projected 70-group Air Force will cost some eight billion dollars a year—a sum greater than the combined amounts spent by all the great powers in the world for military purposes in 1913, and not far short of Hitler's rearmament effort of 1933-1939.

The sheer cost of air power places a heavy load on all men responsible for national security; for as air power channels more and more of the national productive capacity to its needs, less will be made available to the other services. Yet as long as the capabilities of air power remain dependent on these services, they can only be neglected at the jeopardy of air power itself.

Related to the cost of building and maintaining an air force is the tremendous burden of the logistical support required for its operation. Air logistics is both vast in quantity and complicated in scope. The B-29 that requires a score of different lubricants also consumes gasoline by the carloads. Any curtailment in domestic oil production may seriously affect the sustained operation of an air force. Foreign fuel sources may be utilized, but these will impose an additional burden of surface military protection. Synthetic fuels may be produced, but in such case the labor and materials required for synthetic fuel manufacture will compete with those required to make aircraft. Transportation of fuel, requiring vast quantities of steel in the form of pipe lines or tankers, and for convoys to protect overseas shipments, likewise complicates the logistical support of air power.

One other important logistical factor is the vast quantity of material required to create air bases, many of which

must be established overseas. The cement needed for one B-29 runway alone must be figured in terms of the capacities of Liberty Ships. The time required to construct an air base is also a limiting factor in the use of air power, although the development of tracked landing gear may eventually overcome this limitation.

Air Bases

It is a general rule of warfare that decisive blows are always launched as close to the enemy as possible. The advent of intercontinental missiles equipped with atomic warheads may amend that rule, but it still remains true as regards present-day aircraft. Although the range of aircraft is increasing, such extension is generally accomplished by upping the fuel capacity and lowering the payload. Longer ranges likewise mean longer time in the air, greater vulnerability, and weaker fighter protection. The advantages to be derived from getting as close to the enemy as possible, plus limitations in aircraft range, dictate the selection of air bases. But in a given situation the desirability of certain areas for bases will be well known, and a potential enemy will place the seizure of such bases high among his strategical objectives. The seizure and defense of advanced bases, however, can only be accomplished by armies supported by navies or by airborne operations. The capability of a given army to seize and hold air bases is, therefore, a limitation on air power. But to seize bases, ground forces will need liberal tactical and transport air support, which can be provided only by decreasing the portion of air power assigned to the strategic air forces.

Damage inflicted from the air—the Mitsubishi Ordnance Plant, which was near the hypocenter of the atomic bomb dropped on Nagasaki, Japan.—US Army photo.

Pushing air bases forward in a struggle against a distant foe—primarily by land

power or amphibious operations—directly affects the capabilities of strategic air power; for the efficiency of a strategic air force improves as radar and navigational aids are placed nearer the enemy.

The fact that the most effective air bases are likely to be located overseas places the sea lines of communication of an air force at the mercy of submarine attacks. Air attacks against submarine bases may not eliminate this danger. Allied air attacks on German U-boat pens, for example, caused only 8 per cent of Germany's total submarine losses. Therefore, the demands for the naval protection of sea routes of communication place a limitation on the use of strategical air power, since such protection can be assured only by diverting an adequate proportion of the national effort to sea power and accompanying air support.

At the present time, air bases close to potential enemies are indispensable. Certain developments may lessen the need for such bases. In addition to the use of tracked landing gear and increased range capabilities, refueling in flight may further increase the built-in range of existing and future aircraft. One-way bombing operations, such as were sometimes employed during World War II, may also obviate the necessity of a great number of advanced bases.

Tactical Support for the Army

The testimony of high German and Japanese ground commanders is sufficient evidence of the important effect that command of the air has on the success of a land campaign. Von Rundstedt considered that the German defeat in the West was due to three factors, all related to air power. These were: the disruption of rail communication in Germany and in the rear of the army's lines; the destruction of the *Wehrmacht's* motor transportation, coupled with the German Army's inability to make daylight road marches; and finally, the carpet bombing of assault corridors.

Air superiority permits an army commander to give effective logistical support to his forces, while it denies such freedom to the enemy. Air superiority gives tactical security to one's own troop movements, while denying it to the enemy. It could be said that no sustained offensive against a determined enemy from now on can succeed without air superiority. And while air power itself cannot force an enemy withdrawal, it can critically interfere with enemy land communications. Yet disruption of the enemy's communications is increased by pressure from ground forces, which requires heavy logistical expenditures by the enemy to counter. Moreover, air power cannot completely isolate a continental battlefield, although it can come close to achieving this objective.

The use of tactical aircraft in a ground support role may be limited, in the future, by increased effectiveness in antiaircraft fire. Such fire may be countered, however, by increased aircraft speed; yet if speed increases disproportionately, it may lessen the ability of pilots to recognize and hit tactical targets.

Strategic Air Power

In addition to the limitations imposed by the need for bases, air power is also limited by the difficulty of locating and hitting targets whose destruction may prove to be decisive to the enemy. The working objective of strategic air power is to gain freedom of action over the air space of an enemy. This objective requires that a substantial proportion of the enemy's own air force be destroyed. There are differences of opinion as to how this can best be accomplished. While the theory of destroying enemy air bases and aircraft production centers is attractive, World War II experience indicates that most of the hostile air forces were destroyed in air battles. Improvement in air defense

may blunt the ability of air power to master the enemy's air space with conventional-type aircraft.

The amount of air superiority required for certain strategical operations is subject to debate. As the offensive characteristics of aircraft increase, the need for mass flights may disappear and along with it the term "air superiority" in the sense the term was employed in World War II.

The question whether an enemy can make his armed forces independent of the national economy for any length of time by preparation must also be considered in assessing strategic air power. Similarly, the question whether powerful military installations can be rendered immune to any type of air attack cannot be ignored.

Related to the matter of target selection—which has incidentally improved to a considerable degree—is the problem of mass destruction versus special destruction of key installations, although use of mass destruction weapons may prevent making this distinction. The issue becomes apparent by matching General Arnold's statement that the indiscriminate widespread destruction of enemy industry is simply a waste of effort, with Air Marshal Harris' conclusion that the quickest way to win a war is to destroy the enemy's industry generally, i.e., his cities. It might be added that Harris' observation is more in line with the Douhet dictate: "To conquer an enemy it is essential to inflict upon him a terrific sum total of damage."

Air Power and National Policy

If the Douhet principle, as stated above, is followed by choice or necessity, (i.e., the use of mass-destruction weapons), the purely military success of strategic air power may harm, rather than support, the ultimate goals of national policy.

Douhet's principles were followed in the air war against Germany and Japan. So far-reaching was the devastation produced, according to General Spaatz, "that we were obliged . . . to start pouring out billions of dollars to restore the productive capacity we had just spent billions to destroy." If air power can achieve its strategic aims only by creating such conditions, it suffers from a very serious limitation indeed.

It is in the study of the relation of air power to policy where the most critical thinking is needed. Military power is only one element of total war. Subversive warfare, psychological warfare, the gaining and holding of allies, are equally important to winning the true objective of war, which is not to impose our will on the enemy but to create world political arrangements in harmony with our national aims.

Conclusion

Air power is the dominant force in modern war. At present it is not the exclusive military force, nor is it likely to become such. It has tremendous capabilities, but air power also has serious limitations, especially in the drain it places on national resources and the possible damage its misapplication can bring to the attainment of national objectives.

For these reasons, the role of air power does not belong to airmen alone, but should be the constant study of all who serve this nation.

The almost unlimited power of mass destruction, made possible by the cooperation of all forces to attain air supremacy, is something so staggering in future potentials that we must give sober reflection to the meaning of our victory in 1945.

General Carl Spaatz

Military Technology and the National Economy

J. Carlton Ward, Jr., Chairman of the Board,
Fairchild Engine and Airplane Corporation

In considering the relation of military technology to the national economy, it is obvious that many new and valuable technological improvements have their origin in times of conflict. The intense motivation of the war effort stimulates men to bring to fruition many unfinished projects and to conceive, under pressure of fear for the national safety, bold, new ideas. The question of immediate financial returns at such a time is unimportant and, in fact, irrelevant. It is possible, therefore, to go ahead at full speed on programs that would not be justified on a basis of profits. For these reasons, many advances in technology are made during war which might have been delayed for decades or generations in times of peace. Likewise, numerous new developments are made in peacetime during preparation for and in anticipation of a coming conflict.

These considerations most emphatically do not create a case for war. The destruction of life and property and the overthrow of institutions due to military conflict are infinitely tragic. If men were rational animals, this wasteful type of conflict would be replaced by a system for the orderly and legal settlement of controversies. But the subject which I am discussing is military technology and the national economy. In an objective consideration of this topic, one is forced to take note of some of the accomplishments of research and development which carry on into the economy of peace and sometimes transform it with original and daring innovations. To what extent these gains offset the losses of war would require a complicated quantitative calculation that, so far as I know, has never been performed.

Most Americans are ready to admit that this country leads in general technology. We certainly are ahead in military technology. There was a myth for a long time that the Germans had the predominant position in military technology. It is sometimes an American characteristic to underrate our own accomplishments. When we see unexpected achievements in a foreign country, they are apt to take on a strange value. Many of the things that our potential enemies did appeared to transcend our own capacity or performance. In many cases, however, the foreign accomplishment was merely the reflection of a budgetary action, that is, the diversion of the economic strength of that nation to a particular objective.

As a democracy responds to an emergency, however, it becomes increasingly more effective than a totalitarian state. The atomic bomb is a very good illustration of this superiority. In Germany, there was an effort parallel to that in the United States for the development of atomic explosives. The defects of a totalitarian state in the harnessing of its scientific resources, as opposed to the efforts of a democracy, are clearly re-

vealed in a report labelled "Alsos," the Greek word for groves (for General Groves who commanded the atomic bomb project), written ably by Dr. Samuel Goudsmit. It contains a wealth of information regarding the methods of a totalitarian state in bringing about a forced development. Instead of summoning all of the resources of the nation and bringing them to bear in an attempt to solve the problem, the totalitarian state lays down a party line, a technical party line, if you like. Efforts from there on must follow the technical party line. Those of you who have read the Russian news lately must be impressed by the fact that even biology must yield to the Soviet party line.

The technology of combat was developed with greater efficiency in our democracy where the vast resources of a free economy were summoned together under the stimulus of a nationally understood emergency. Human life is held at a premium in a democracy, which strives to furnish its fighters with highly developed weapons to destroy the enemy with the maximum efficiency and to reduce its own casualties to the minimum. It is for this reason that, in an aroused free society, weapons are developed with astonishing efficiency by bringing all initiative and all resources to play on the problem.

It is feared by some that atomic energy, first developed by a democracy, may destroy civilization. Something like that was doubtless said many times about gunpowder. Gunpowder is a chemical chain reaction. It differs but little from the atomic bomb nuclear reaction except that atomic energies are in the order of, let us say, a hundred million times greater than chemical energies. If gunpowder had been used solely for war, it would have been a very unfortunate discovery. Perhaps it was originally developed for war—its origin lies back over two thousand years in ancient China.

However that may be, gunpowder and explosives have made possible the great dams, the great reclamation projects, the great highways, the railroads, and the building construction projects which are so important in modern civilization. So gunpowder, instead of being regarded solely as an explosive for war, may actually have had more of a constructive effect than all the damage it produced.

It is very clear that from modern war certain technological improvements have resulted. World War I produced the general dissemination of the techniques of mass production. They had been known prior to World War I and had been in limited use. But the degree to which systems of precision measurement and gauging were developed in World War I, and the techniques and arts of mass production were taught and disseminated throughout the war industries, remained as the great gift of that war to industry and production.

Many new and valuable technological improvements have their origin in times of conflict. Carried over into the economy of peace, some of these accomplishments result in original and daring innovations

War-Developed Techniques

In addition, in World War I, there were a great many precision techniques developed. Prior to World War I, a thousandth part of an inch was considered to be a very high precision measurement. Subsequent to that conflict, practically all of the metal-working and precision industries worked commonly within a toler-

ance of a ten-thousandth part of an inch. This change came about through the absolute need of a wartime industrial economy for manufacturing in City A the components of parts to be assembled in City B.

World War II disseminated further those techniques. It also produced new by-products of military technology in the field of energy which fit into the picture, demonstrating the strong relationship between energy, productivity, and standards of living. World War II consumed more energy resources than have been used up in any comparable period in world history. A severe upward pitch was shown in the curve of man's utilization of the energy resources of the planet, in the form in which he has been accustomed to use them. By the same token, however, it showed the diminishing returns for many of these energy resources, and we are forced to ask how we may develop new sources of energy.

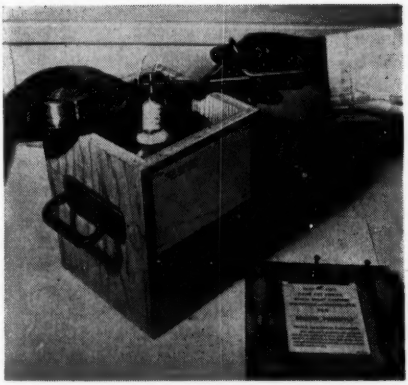
One of the answers to the question of new energy has been the liquefaction of coal. This was done first in Germany because the Germans realized that they did not have petroleum resources sufficient for a major war. By this process, they produced superb lubricating oils, and they produced all of the essential petroleum products necessary for a war economy. The German success attracted the attention of American military technologists, for fuel oil today is absolutely essential in any large-scale military effort. So American technology picked up these German techniques and has now gone far beyond the point at which we took them from the Germans. We have added vastly to the chemical energy resources by the techniques of World War II. The shale supplies, which have always been uneconomic, but which in quantity are far beyond the ordinary oil supplies, are now the subject of pilot-plant development. Strangely enough, the oil technologists have been faced for the last 30 years with the fact that, statistically, at least, we were going to run out of oil. The final depletion of our oil supplies has been like the bow wave in front of a ship, which is always just ahead of the ship but never quite overtaken.

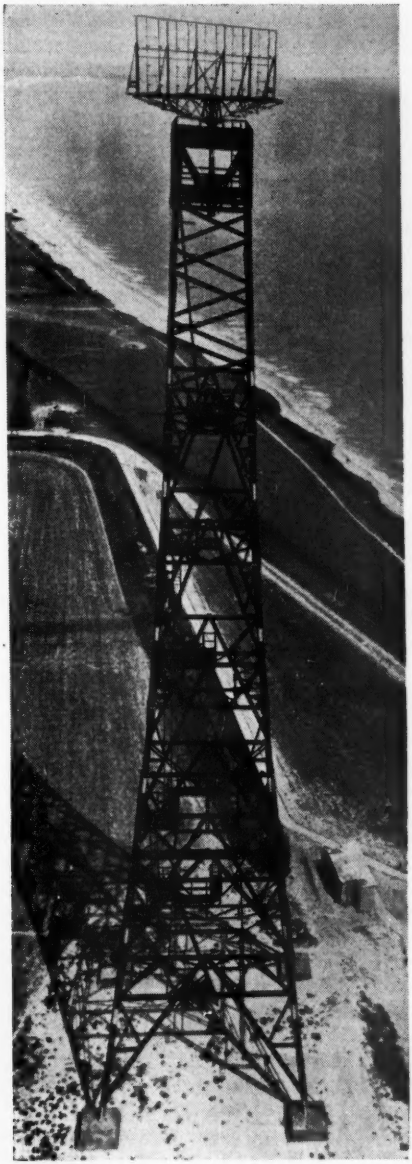
So the predictions of the exhaustion of petroleum resources have been almost constant during the last two or three decades. Today there are more proved petroleum reserves than at any time in our history. There is a better understanding of our reserves than at any previous time. That understanding is a wartime development which has come about through an advance in geophysical exploration which, in turn, has come about through some of the electronic developments that were forced into being in the war. In the energy field there was, of course, the most important development of all, that of nuclear energy.

Electronics

The field of electronics, which deals with the harnessing of the electron for control purposes—instrumentation—and for the extension of man's own senses, is an outstanding development accelerated entirely by the war emergency. Back in 1925, on the outskirts of Washington, two Naval physicists discovered the principles of what we know today as radar. In 1925, nothing much was done about it, although some reports were written and filed. Those were the days when the government was not as conscious of the necessity for research.

It might be pointed out parenthetically that during World War I, throughout all industry and much of government, attention was focused on the necessity for research in an orderly fashion. That war made all of industry research-conscious, and many of the great industrial laboratories owe their existence to the awakening in World War I. But research received a much greater acceleration in World War II. And so it was that this fallow dis-





Many technical discoveries, born of wartime necessity, later have important applications in the peacetime economy. Above, a radioactive isotope, being packed for shipment, is a development from the research on the atomic bomb. Radar equipment (right), installed along the coast of England, helped win the Battle of Britain. In peacetime, the Coast Guard (below) uses radar to spot icebergs in the North Atlantic.—Photos courtesy of The Pegasus.

covery called radar, that lay in the files of the Naval Research laboratory, became one of the important factors that enabled the British to win the Battle of Britain when they were being so extensively mass-bombed by the Germans late in 1940.

Sir Watson Watt, who became knighted after his radar achievements, took this American scientific principle and fashioned from it a tool which allowed man to see far beyond the limits of his physical sight. The British observer saw the German bombers as they took off. He counted them and measured their course. The Germans, who expected to destroy sitting ducks on the British air fields, found no planes on the fields. The British planes were in the air, shooting down the Germans. The Germans were baffled; they could not understand how a little force of 700 British fighting machines could lick the might of the *Luftwaffe* that was then sending 2,400 bombers over England. The British did it by the extension of human sight through radar, now known to be one of the great dramatic developments of history. It was the time that radar bought that permitted this country to rearm and become the arsenal of democracy.

This principle has been extended to an astounding degree in many fields. The great navigational system called Loran permitted our naval vessels and airplanes to travel through the reaches of the Pacific in the dark and in foul weather, always knowing precisely where they were. When we were in enemy areas and did not have control of land bases, we could navigate with complete assurance. The same was true in the Arctic regions. I have been on Naval vessels in the dead of night, with the fog so thick that one could not see from the bridge to the deck, and yet the navigating officer would know his exact location.

These were all developments in electronics, and there were many more. The computing machine harnesses the electron. It is a complicated electronic development that reduces mathematical equations and makes it perfectly possible to apply them to phenomena that otherwise would have to be determined individually.

These wartime accelerated developments are not an argument for war. Perhaps they would have come into being without war. But it has been in a national emergency, when we have been denying ourselves joy-rides in the country on week ends, or denying ourselves extra shoes or refrigerators, or stopping the construction of homes, that we have diverted the necessary funds into the necessities of war. Much of it was wasted. We cannot claim that the tanks that were manufactured and blown up were a "gift" to civilization. The ravages of war are too apparent. My purpose, however, is merely to talk of the technological aspects of war developments, and I want to keep them in their correct focus. Their correct focus is that they are, merely as a sideline, very important determinants of the economy that emerges from the war. For, after a war, society never proceeds along the same old economic paths.

The very fear of future war has set in motion the study of our resources with far-reaching effect. A recent example has been given in the indirect effects of the so-called aeronautical jet turbine. Gas turbines have been on the engineering horizon more than 30 years. They were not successfully developed because there were no ready materials that would withstand the high stresses and high temperatures required for efficient power generation in the high-speed whirling blades of the turbines themselves. High altitudes and high speeds made such a power plant ideal, and under wartime necessity accelerated development began.

Out of this we have today a new form of power plant that may do fully as much to revolutionize power generation as did the steam turbine in its era. To make such gas turbines requires new alloying ele-

ments in relatively large amounts, such as cobalt which, hitherto, had been mainly known in a popular sense as a blue pigment used in ceramics and to engineers as an ingredient of high-speed metal-cutting alloy tools. Now it is a unique and most valued ingredient of gas turbine wheels, and the search is on for more and more strategic sources of it.

Similarly, columbium, which had formerly been a rare chemical curiosity, has now come into being as an important alloying element, giving steel great properties for absorbing punishment or, as the engineer says, impact. At the moment it seems that columbium will come mainly from little-known Nigeria in Africa, which may, in turn, bring about industrialization of natives who have lived in remote jungles in the most primitive fashion, forgotten by their civilized brethern.

Peaceful By-Products

It is not difficult to see that these examples can be extended almost indefinitely, and that war technology not only accelerates the peaceful by-products that come about through perfecting weapons for war, but reaches out into far-off areas and affects the lives of individuals in all climes and in all states of civilization—individuals who may never be thought of as directly involved in the power politics of the great nations.

Certainly the airplane, itself, would never be concerned with supersonic flight as it is today, had it not been for the impetus given to its development as a weapon of war rather than as a transport for peace. The very creation of successful airplanes for supersonic flight when extended to transport will bring all of the world into closer kinship, one people with another. It is not thought to be at all out of the ordinary for businessmen, diplomats, or other citizens to leave the United States for a week end in Europe and return to their normal pursuits without loss of business time or severance from their active responsibilities. Such high-speed airplanes are the accelerated product of wartime development.

Thus, the development of the Constellation, which was the first of the great post-World War II transports, was the product of continued development through the war period as a potential carrier for airborne troops and for the logistic supply lines of far-flung combatant forces. The great airlift over the hump, through the back door into China, was an uneconomical wartime necessity that demonstrated to all the world the enormous potentiality for airborne cargo, which, today, we see exemplified in the Berlin airlift.

Who can say what has been the impact on the remote peoples of the earth of these great triumphs of engineering technology? Who can say whether the facility with which peoples can now intermingle through rapid transport by air may not be a contribution to the future peace of the world, greater in influence than was the enormous wastage of resources and life in World War II?

Fruits of Atomic Research

Atomic fission was the outstanding development of World War II, and already atomic energy bids fair to give us new techniques, new tools with which to fashion a better life, surpassing even its great power for destruction. The techniques of tracer chemistry are unlimited, not alone in the physical sciences but also in the biological and genetic fields. The very laws which have made possible the atomic bomb have revealed to us a potential chemistry that staggers the imagination.

The little green leaf, which manufactures from sunlight, water, and air the materials that maintain life on this planet, has been a secret for all time. The mystery is now, however, in the stage of being revealed. The processes by which the chlorophyll of the leaf fashions dead, in-

ert materials into living matter, are now being identified and understood. Not only is the energy which can be freed by a nuclear reaction from uranium or thorium, or the products of uranium and thorium, of tremendous magnitude—assuming that some means can be found of concentrating these minerals that are now so dispersed—but the energies that are emitted in the process can unlock the doors to synthetic chemistry as magically as the chlorophyll in the leaf can harness these inert materials that form the whole basis for life on this planet.

Pure chemistry in the inorganic field has already, by atomic means, produced four new elements that did not exist on this planet until the birth of the era of atomic energy, that is, plutonium, neptunium, curium, and americum. These are four new elements that, aside from their recent artificial production, did not and do not exist on this planet; they have been created out of the new science of atomic energy. They are inorganic materials, and they may have great portent for the future.

Looking into the crystal ball to see the eventual by-products of this accelerated development (a product of military technology), one can envision in the field of radiation synthesis new compounds of biological importance that may enrich man's life, may reduce disease, increase the food resources of the world, and destroy the Malthusian concept completely.

Tracer chemistry has already gone to work on the question: How does a plant digest fertilizer and how can this process be made more efficient? It is engaged with the problem of fashioning a rubber plant, which now will only flourish in a tropical climate, so that it will grow and produce rubber in a temperate climate. Fertilizers are made atomically active. A rubber molecule is fashioned out of the fertilizer and from inert soil and the atmosphere. Then, by a process of genetic control, plants are being created which did not exist previously on this planet. This may lead to the development of a plant which will be a high rubber producer and which will flourish in the climate of the United States. This country will then have an ample supply of natural rubber within its borders. So, if one looks into the magic room of atomic science, one finds not the sheer terror of an unleashed explosive, but a vast magic box of fascinating new possibilities that can bring a richer and better life to this earth.

In 1905 Einstein brought out a very simple formula which is probably one of the greatest products of sheer abstract thinking that man has ever produced. The formula—$E=MC^2$—simply means that matter and energy are the same thing. Matter is your desk, my hand, or a pencil; it is anything which, as Newton would say, has the properties of inertia and momentum connected with it—mass, as he called it. Energy has always been considered as the ability to do work and as having no mass. Light, as it comes through the interstellar space, has been described as energy and as having no mass. When the astronomers got mixed up on the fact that the stars shifted during an eclipse and that the eclipses themselves had minor errors of fractions of seconds in their timing, they found the explanation in the Einstein formula, which pointed out that energy—the kilowatt hours such as you get over your electric light meter—is the same thing as mass. The reason why the two do not seem the same to us is found in the physiological limitations of our five senses.

Einstein showed the correlation of energy and mass in the simple formula mentioned above—$E=MC^2$. In this equation, E is energy, M is mass, and C is the velocity of light, which is 186,000 miles or 982,080,000 feet per second. If weight is divided by the acceleration of gravity, which is the physicist's way of getting weight into its equivalent mass, and if the equa-

tion is multiplied out and then turned into foot-pounds and from foot-pounds into kilowatt hours, that one pound of mass becomes equivalent to the amazing total of a little more than 11,000,000,000 kilowatt hours. Now the total installed electrical capacity of the United States is perhaps 50,000,000 kilowatts. The energy which we normally use, produced by such means as the burning of coal, is second-hand chemical energy. The production of energy of this kind, as compared with the production of nuclear energy, is a very wasteful process. If the primary sources of energy, rather than the bottled-up, second-hand sources, are used, the economy of the earth can be made to run for a very long time.

The greatly intensified researches of World War II hastened the disclosure of the secrets of nuclear energy. There may come a time when these military technological developments will eliminate war. Bacteriological warfare, it has been said, can exterminate mankind. We have the means of bacteriological warfare; it is no secret. Then there is chemical warfare. World War I showed the awful ravages that could be spread by the use of the then-existing poison gases. The poison gases of today are more terrifying than those of World War I. But although those gases were available and although opposing nations had the means of bacteriological warfare, man did not destroy himself in World War II. So, although many people believe that the birth of atomic explosives will automatically mean the end of man, there are precedents which indicate that, in the long run, the social scientist can step in to direct that what could have been man's destruction shall be fashioned into the means of human progress.

To the student of nuclear physics, there are more blessings for mankind hidden in the vast forces of the atom than in all those great scientific developments that preceded it throughout recorded history. Those who fear atomic energy should study well the history of earlier power sources. Tracer chemistry and tracer biology have furnished us new tools to unlock the mysteries of life to a degree that has never before been available to modern science. The power possibilities of the atom are, as yet, unrealized. Let the social scientist bend his efforts toward understanding the great good that can come from an enlightened use of these new tools—the by-products of war technology—and let him apply himself to making understandable those human processes by which the new benefits can be made to all mankind. They will dwarf, by comparison, the evils that man could engender were he sufficiently insane to use these new forces in efforts of destruction.

One of the happiest aspects of the role of science in national defense lies in the fact that if we keep our efforts in proper balance, science can, in addition to insuring our security through military technological strength, provide us with better health, better jobs, economic security, and broader horizons, with accompanying cultural progress—all leading to a fuller and more fruitful life.

Major General Anthony C. McAuliffe

Instructor Training at Leavenworth

Colonel Harold D. Kehm, *Field Artillery*
Chief, Instructor Training Section, Command and General Staff College

THE report on "Educational Lessons for Wartime Training," recently published by the American Council on Education, has served to focus attention on military instruction. It is stimulating reading for all who are interested in methods of teaching. Publication of the report brings to mind instructor training in graduate educational institutions, a field in which the Army is the pioneer.

The instructor training course at the Command and General Staff College has gone through two major modifications in consonance with the two postwar "reconversions" of the College. It will therefore possibly be profitable in keeping the Army in the lead in this field if the program and methods used at the College are presented for consideration by the Army as a whole. It is the purpose of this report to tell what the instructor training program at the College is and to clarify why it is what it is.

Purpose of the Course

The purpose of the course is to give newly assigned instructors a standard foundation and orientation of the basic policies and methods employed in the instruction here, and to inform them about the mission of the College, the nature of the student body, and available facilities.

Based on an understanding of these policies, methods, and facts, and his own prior experience, the individual's abilities as a teacher are continuously developed during his tour as an instructor through actual performance under continuous constructive supervision by his group chief, Department Director, and the Commandant and the Assistant Commandant acting directly and through their staff agencies. The course is not built on the illusion that it should, by itself, produce a finished instructor. In the first place, some newly assigned officers are competent, experienced, instructors when they get here. In the second place, the law of diminishing returns sets in very early in any training course and particularly so under the conditions at the College. Although experience shows that all officers benefit from the training, more progress is achieved by experience, once the common fundamentals are established, than can be gained from a prolonged training course which gets into abstract theory or into too many details of procedure. The length of the course is therefore set at three weeks.

The content of the training course is determined by a number of factors. The basic factor is the mission of the College. Others include the conditions of time, space, and facilities; the educational attainments of the students and the instructors; and the instructional policies and methods employed at the College.

Instructional Policy

At this point it will be well to consider briefly four features of instructional policy at the College which play a critical

part in shaping the current training course. They are: the integrated unit idea; the employment of one instructor to conduct the instruction in all aspects of one unit with a given group of students; the use of small classes; and using the classroom period to build on what the student has learned by his own study.

In the integrated unit, basic theory and application concerning several command and staff activities involved in a given military situation are combined in one problem. By this method, theory is made more meaningful to the student and the interrelation of various staff and command functions and processes can be most realistically brought out. For example, the initial map exercises of the College serve as vehicles for learning certain basic principles and procedures of command and staff activities of the division in combat. One map exercise portrays an infantry division moving into an attack position and launching the attack. The major features developed are:

1. Decision to move and deploy.
2. Combat intelligence sources and agencies.
3. Replacements for the division.
4. Supply for the division.

The instruction in this problem is so oriented that in the decision to move and deploy for attack the student learns basic command considerations and analyzes the combat capabilities of the infantry division. The intelligence instruction concerns the division in the same situation and covers sources of information, availability of collection agencies, and basic principles of ground reconnaissance. Fundamental replacement procedures are incorporated in the personnel part of the exercise, and basic principles of combat zone supply and supply terminology are included as the logistics instruction. In each case, the student studies the applicable doctrine and applies it to this particular situation. He had to understand how these different fields fit into the command picture. Since this is one of the initial subjects of the course, an interesting feature is introduced by incorporating instruction in the technique of solving map exercises in the problem. This latter is introduced as a parallel to the methods used by a commander in arriving at his decision. This integrated system produces a more efficient and interesting unit of instruction than when each subject is treated in a separate conference or exercise. This is true because theory is applied directly, and the interrelation of the separate parts into the complete command and staff process is made clear to the learner. It is apparent that such units require intelligent planning and skillful conduct.

Instructors at the C&GSC also go to school; a three-weeks course gives the new members of the faculty a standard foundation and an orientation in the basic policies and methods used at the College

The fact that the same instructor conducts all aspects (logistics, personnel, tactics, etc.) of one unit with a given class means that the instructor must understand clearly all ramifications of the unit and know how to employ the various methods and techniques in teaching many different subjects.

The fact that classes consist of approximately 36 students each permits greater use of the exercise and conference methods. Lectures are ordinarily given only in special subjects such as radiological safety, Navy doctrine, Air Force doctrine, etc. The class is assembled as a whole for such periods. Lengthy oral dissertations by the

instructor are discouraged. Furthermore, the instructors get to know the members of their classes quite well and can give more consideration to individual differences than was possible with classes of 500 students, as in past years.

Since classroom time is to be used primarily for application and clarification, rather than for gaining original familiarity with the subject, the instructor must know how to plan his instruction so that he can begin on the basis of student study rather than merely repeat it. He must know how to clarify obscure features and above all he must know how to guide and control application by the student.

These and other policies which the College follows in its instructional program are based on two fundamentals which Army training policy has long recognized, that the student does the learning and that he learns best by realistic doing.

General Subjects

Analysis of the general factors described above will reveal that an instructor at the Command and General Staff College must have a clear appreciation of the general subjects listed below:

The mission and academic organization of the College.

The nature of the student body.

The basic principles of learning.

The capabilities and limitations of the various methods used at the College.

Planning the unit of instruction.

The accepted techniques of conducting various methods of instruction.

Oral presentation.

The evaluation process.

The instructional facilities of the College.

Therefore, these are the broad fields covered in the training course.

The scope of each general subject is limited to that required to give the instructor a common orientation and indoctrination. The amount of time and effort which need be spent on these essentials is in a large measure determined by the background of the new instructors. Therefore, it is appropriate to consider where the instructors come from and the nature of their backgrounds. As to source, a high percentage of the junior instructors comes directly from classes completing the Regular Course at the College. The majority of the supervisory and key instructors come from graduating classes of other service schools and colleges, graduates of special courses at civilian colleges, officers returning from foreign service, or those completing other key duties. As would be expected, the officer's background, efficiency, and ability as an instructor are given highest consideration. The college studies all available records and considers the opinions of as many officers as possible before indicating favorable consideration to the assignment of any particular officer.

The current faculty includes officers from all the arms and services. Grades range from major to colonel, with lieutenant colonels in the vast majority. Amount of service varies from about six and one-half to 34 years. Experience in all theaters in peace and in war is represented. Graduates of all the service schools and colleges (Army, Navy and Air Force) are included. All have undergone and conducted considerable formal training in military units. A few have been teachers in civil life. A considerable number have been instructors at service schools.

Considering these qualifications, it is clear that the prospective instructor already has a good working knowledge of the fundamentals. To be specific, it can be considered that he understands FM 21-5, MILITARY TRAINING, and knows the techniques of good training, at least to the extent required for training in a military unit. He is certainly not a novice in either the science or the art of teaching. The scope of the course reflects this fact.

In each instructor training course the

qualifications of the students vary widely. It is not possible to tailor the instruction to meet all these differences. However, they are kept in mind and furnish one reason for some of the modifications which are made in each course. The high degree of motivation in the new instructors is another characteristic which plays a role in shaping the course. It permits the use of comprehensive assignments in securing the optimum in self-teaching.

To sum up consideration of these factors, we have seen how the mission and organization of the College, the academic policies, the characteristics of the student class, and available facilities are the primary factors considered in determining the subjects taught in instructor training. We have also noted that the qualifications of the new instructors are the principal factors used to determine the scope of each subject and the methods used.

Scope of Instruction

These two sets of factors are under continuous study. As they change, modifications are made in the subjects, scope, and methods of the instructor training. The current scope of instruction is indicated in the subjects listed on this page.

The basic texts used in the courses are FM 21-5, MILITARY TRAINING; TM 21-250, ARMY INSTRUCTION; and an Instructor Training Manual prepared at the College to supplement the official manuals. As is indicated in the list of subjects, the methods of instruction used are those favored by College policy for Regular Course instruction. In the two practice teaching periods which each student conducts, he sees to the preparation and issue of all material to his students. The officers in his class, and such additional officers as can be secured, comprise the class. They are required to prepare for the class just as the regular student does and to react as such.

In both the oral presentation exercises

Subject	*Type*	*Hours*
Opening Exercise: Introductory remarks Registration		1
Mission of the College and the Student Body	C	1
The Organization of the College: Curriculum and Purpose of the Training Course	C	1
General Principles of Learning	C	1
Planning and Preparing the Instructional Unit	C/EX	2
Instructional Aids	DEM/C	2
Library Services	DEM/C	2
Methods of Instruction	C	1
Research	C/EX	1
The Conference	C	2
The Exercise	C/EX	2
The Map Exercise	C/EX	2
Classroom Facilities	C	1
Oral Presentation	C	1
Oral Presentation Exercises	EX	2
Preparation of Instructional Material	EX/C	2
Conference Leadership	C	1
The Review	C	1
The Terrain Exercise	C	1
The Assignment	C/EX	1
The Lesson Plan	C/EX	1
Use of Blackboard and Visual Aids	C/DEM	1
Individual Conferences on Oral Presentation	EX	1
The Lecture and Demonstration	C	1
The Map Maneuver	C	1
The Integrated Unit	EX	2
Practice Teaching (20 minute conference)	EX	8
The Evaluation Program	C/EX	3
Preparation of Requirements	C/EX	3
The Faculty Adviser System	C	1
Preparation of Examinations	C/EX	3
Practice Teaching (40 minute exercise)	C/EX	8
Extension Courses	C	1
Supervision of Instruction	C	1
Panel Discussion of Practice Teaching	PANEL	2
Scheduled Individual Student Research	EX	19
Reserved for Course Director		5
Graduation—Closing Exercises	C	1
Total Hours		90

C—Conference. EX—Exercise.
DEM—Demonstration.

and the practice teaching, self-evaluation is emphasized. Consequently, the student's performance is evaluated by instructors and one other student. A composite evaluation is determined and returned to both the student evaluated and the evaluator. The idea is to encourage correct and systematic evaluation as a primary step in self-improvement.

It is stated College policy that every instructor must complete the training course of instruction before he does any teaching. In the emergency resulting from reorganization of the curriculum in 1948, some instructors have received only two weeks training. Where the need is indicated, the additional week will be taken at a later date. A rigid adherence to basic policy is indicated for the future. Certificates are given to those who successfully complete the course and plans have been made for accreditation through the Commission on Accreditation, Washington, D.C.

Courses are conducted when there is a need for them. Ordinarily there is one early in the summer for those students of the graduating class who are retained as instructors and for other officers who join the faculty between training courses. This is followed by one late in the summer for those officers who arrive during the summer. There is a catch-all course in the late fall for any who have been missed by previous courses.

The Faculty

The permanent faculty for the course consists of two officers. They conduct much of the instruction. However, a large part is conducted by officers from the academic departments who are particularly experienced in a given field. The Section conducts a course for Allied Officers and provides counselling service on instructional methods. Provision is made for follow-up supervision of graduates of the training course. Each department, of course, supervises and guides its instructors carefully through briefings, visits, and critiques.

The College adheres to the belief that this instruction should be planned, supervised, and in large part conducted by military personnel, since they are in the best position to evaluate and guide the application of educational doctrines and practices, whatever their source, to military instruction. During the summer of 1948, Reserve Officers who are in the educational field in civil life were employed to assist in the planning and conduct of the courses. Their advice and that of the College Psycho-educational Advisor and the Statistical Consultant are used extensively. The evaluation instruction is conducted by the Statistical Consultant. The current oral presentation program was developed on the basis of advice from Reserve Officers. The current draft of the manual contains some material originally written by the Psycho-educational Advisor and the Statistical Consultant. The planned revision reflects the work of these individuals and several Reserve Officers. It is felt that this plan secures the optimum of value from civilian experience.

The College does not believe that its instructor training is an automatic open sesame to success. The course does serve to give the new instructor a quick understanding of accepted procedures and doctrines. Furthermore, it gives him an opportunity to familiarize himself with tried and tested techniques. The "dry runs" build up his self assurance for the payoff. He acquires a sound basis for self analysis and improvement. The plan saves the Departments many hours of work in orienting new instructors. It helps to achieve a desired measure of uniformity in methods and techniques. The gain in the learning by students at the College is obvious. Since the efficient instruction of officers in command and staff functioning is the only reason for the existence of the Command and General Staff College, it would appear that an instructor training course pays its passage.

The Strategic and Tactical Influence of Disease in World War II

Part II

John E. Gordon, M.D.

Disease in the ETO

FOR each of the four years that the European Theater was in existence, disease was far and away the most frequent cause of admission to hospital or quarters (Figure 4). The highest rate was in 1943, the widespread epidemic of influenza that occurred in the autumn of that year being the chief determining factor. The rates from year to year showed little variation, irrespective of whether the battle was fast or slow. A direct correlation between the activity of military operations and the frequency of disease was lacking. The numbers of persons affected were regularly great, since one out of two soldiers tended to suffer each year some disability from disease of sufficient degree to interfere with military duties. The regularly occurring annual peak of incidence in late autumn or early winter (Figure 5) serves to demonstrate the overwhelming importance of acute upper respiratory infection as the dominant factor in morbidity for this class of disability.

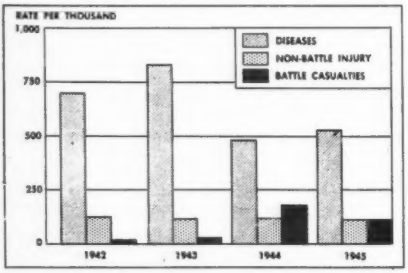
No particular significance attaches to the experience of the first two years of the European Theater. The morbidity rates for disease were in all respects satisfactory and the health record good. The striking feature becomes evident in respect to the last two years. During the height of the campaign, which started in the middle of 1944 and ended in the early summer of 1945, the morbidity rates for disease as judged by admission to hospital and quarters was at a lower level (Figure 5) than at any time during the war. Proverbially, and throughout the history of wars, this is the time when losses have been great. Granted that many soldiers will not report sick during the height of military operations, and particularly in time of advance, nevertheless the fact that so few were seriously disabled by disease is perhaps the clearest evidence that could be advanced of the progress that has been made in environmental sanitation and in the practice of preventive measures.

While disease ranked first among the three major categories of military casualties as a cause of disability, it was the least important as a cause of death. The absolute rate, 0.5 per thousand strength per year, was inconsequential when compared with death rates for disease in other wars of this country, or indeed within the history of warfare.

The two European Wars of the United States offer an opportunity for compari-

Use of the medical services in meeting the strategic and tactical problems of disease in modern war requires not only adequate care of the sick and wounded, but great emphasis on preventive medicine

Figure 4.
All Causes, Admissions to Hospitals and Quarters, European Theater of Operations, U.S. Army, Rates Per Thousand Strength Per Annum, February 1942 to June 1945, inclusive.



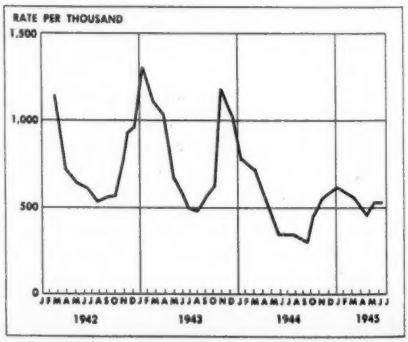
son of the changing trends in causes of death among military casualties (Figure 6). Battle casualties were the principal cause in both instances, but disease dropped from a strong second place in 1918 to a good third in World War II. Deaths from non-battle injuries in the recent war exceeded deaths from disease in a greater proportion than deaths from battle casualties had exceeded disease in World War I. Comparing directly deaths from battle casualties and disease in the two wars, the ratio in the European phase of World War I was slightly better than two to one; in World War II about ninety-two to one.

Losses from battle casualties are difficult to compare because so much depends upon the type of campaign and the development of weapons of war. These two campaigns were fought in the same general region and against the same enemy; to that extent the comparison is reasonable. At any rate, deaths from battle casualties were proportionately less in World War II than in World War I and it is reasonable to interpret that difference as related to improved methods of medical care. Expectedly the active open warfare of the more recent experience would lead to a greater proportion of casualties than the static trench warfare which characterized so much of operations in 1918. While the differences in death rates from battle casualties during the two wars is not great, that in respect to disease is most striking. The losses in 1942-1945 were but a fraction of those of the previous experience, essentially one-fortieth. Only in respect to non-battle injuries did the death rates of World War II rival those of World War I. The rates were almost identical despite the greater hazards associated with a more highly mechanized warfare.

Experience in Other Theaters

The experience thus far presented in respect to the casualties resulting from disease in World War II have related wholly to the European Theater of Operations. The experience for all nine theaters of operation through June of 1945 is presented in Table 2, but carries no suggestion of a comparison of results or an attempted measurement of accomplishment in these several areas of military activity. It is wholly evident that losses from disease are subject to great variation, according to differences in environment, the kinds of risk to which troops are subjected, the prevailing health hazards, and the pre-

Figure 5.
All Diseases, Admissions to Hospitals and Quarters, European Theater of Operations, U.S. Army, Rates Per Thousand Strength Per Annum, February 1942 to June 1945, inclusive.



All Diseases, Admissions to Hospitals and Quarters, Total Army, Continental United States and Theaters of Operations, U.S. Army, Cases and Rates per 1000 Strength per annum, by years, January 1942 to June 1945, inclusive.

Theater	Total		1942		1943		1944		1945	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
Total Army	14120214	667	2047608	671	5163760	768	4550658	606	2358190	609
Continental United States	8578265	653	1699134	669	3793588	739	2261800	564	823743	571
Total Overseas	5541949	690	348472	679	1370172	860	2288858	654	1534447	631
Africa-Middle East	123336	946	7783	1356	59073	1107	42468	896	14012	587
China-Burma-India	308806	929	5951	1046	45636	991	171716	1077	85503	707
Southwest Pacific	1117120	926	55751	832	204267	1046	465289	840	391813	1006
Mediterranean	1148934	849	9618	451	406619	943	558051	846	174646	726
South America	235832	676	84864	825	82748	684	46448	540	21772	558
Pacific Ocean Area	626954	600	72812	494	239851	813	221457	561	92834	448
Alaska	155041	571	33564	668	71615	624	39766	478	10096	431
Europe	1735263	546	50881	700	221078	837	725437	492	737867	538
North America	90663	534	27248	672	39285	548	18226	433	5904	382

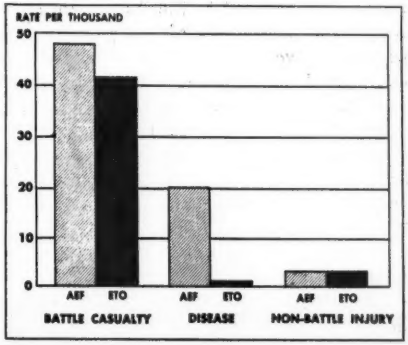
Source: Medical Statistics Division, Office of The Surgeon General, War Department, Washington, D. C.

Table 2.

valence of particular communicable diseases. It is, however, a matter of satisfaction that where environmental conditions were similar and risks comparable, the morbidity rates for disease in overseas theaters compared favorably with those experienced by troops stationed in continental United States, which was 653 per thousand strength per annum. Four theaters actually had better rates, although allowance must be made for the problems associated with recruits in the Zone of the Interior, and the greater resistance of seasoned troops who went overseas.

The North American Theater had the best morbidity rate for disease of all forms, 534 per thousand strength per year. The European Theater, the largest in respect to troop strength, was next. The highest morbidity was experienced by troops of the Africa-Middle East Theater, followed closely by those stationed in the China-Burma-India area and in the Southwest

Figure 6.
Causes of Death in World Wars I and II, Troops of the American Expeditionary Force, Europe (April 1917—December 1918, inclusive) and of the European Theater of Operations (February 1942—June 1945, inclusive) U.S. Army, Average Rates Per Thousand Strength Per Annum.



Pacific. The admittedly greater hazard of the Mediterranean area of Europe as contrasted with Northwest Europe is reflected in average annual rates for disease of 849 and 546 per 1,000 strength per annum.

The analysis of the component causes which served to determine these rates, and a comparison of experience between theaters, is beyond the scope or intent of this presentation. The results universally obtained in respect to a particular disease long recognized as a peculiar hazard of war are nevertheless so striking as to deserve special mention. In the European Theater of Operations, where battle casualties were more numerous than in any other theater, both the mortality and the morbidity rates for tetanus were less than among troops stationed in continental United States, thousands of miles from a field of battle. The almost unbelievably good results, a single case and a single death during the whole period of operations in Europe, are attributable to the remarkable effectiveness of active immunization brought about by tetanus toxoid. No soldier left America without immunization and the greater rates in the Zone of the Interior, of themselves inconsequential, were related to tetanus infection among recruits before immunization had been accomplished.

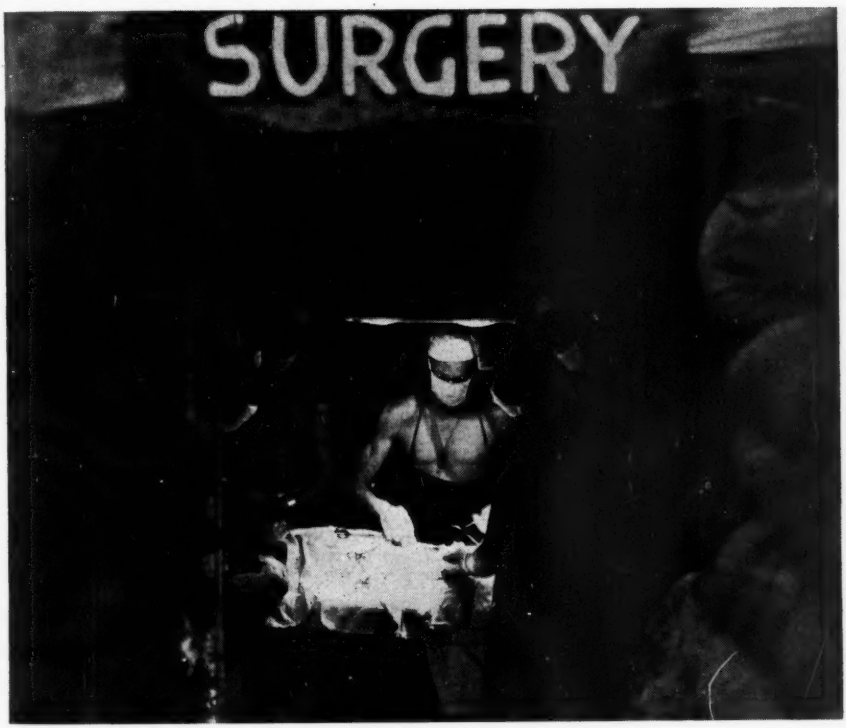
World War II involved more men and extended over a greater geographical area than any other in history. The successful result that accrued to the American arms was influenced in forceful degree by the action of favorable casualty rates for disease previously without precedent. The over-all results speak for themselves. The extent to which disease influenced individual campaigns remains to be examined, first in respect to long term strategic action, and secondly as an immediate tactical influence.

Strategic Influence of Disease

Rarely does the practice of epidemiology on the grand scale reach such potentialities as in war. The epidemic of typhus fever that eventually involved American troops in Germany in 1945 constitutes an outstanding example of the strategic influence of disease in field operations. The epidemic was evident well in advance of the time that it became an immediate military problem, with the result that plans and an organization for meeting the situation got under way as early as 1941.

The probable situation at different times in the projected course of military operations was analyzed in detail. Arrangements for a *cordon sanitaire* along the Rhine River with tentative ports of entry were set up three years before an American soldier crossed that river. A significant change in procedure was incorporated in the plan in 1944 when the value of the newly developed insecticide DDT became evident. Unit responsibility for control measures in the particular area of influence was recognized as the fundamental approach. Provision was made at Theater and Army echelons for teams trained in diagnostic and insect control procedures to furnish the necessary aid and consultation to unit surgeons. The proper administration of the *cordon sanitaire* was made the responsibility of the Army Group.

Typhus was found in Germany in March of 1945 as anticipated, in all a total of 17,000 cases. The number of secondary infections was surprisingly few. The outbreak was eliminated within three months. During this time only three American soldiers contracted the disease, two of them physicians engaged in typhus control. The results contrast with what took place in 1918, although at that time material progress had already been made in knowledge of this epidemic disease and in measures for its control. More than 5,000,000 persons had typhus fever in Russia alone and deaths have been estimated at 2,000,000; in Serbia essentially one-fifth of the population was involved in the epidemic, with



A collecting company surgical team at work in a dugout shelter on Bougainville, Pacific Theater.—US Army photo.

150,000 deaths in a six-month period of 1915.

The potentialities for a similar major epidemic in 1945 were decidedly great, for the existing circumstances were not dissimilar from those of 1918. The difference in result was determined by the advances in technical knowledge that had taken place within recent years, and the new measures for control that were provided. It depended upon careful planning at staff levels, adequate provision of supplies, organization of the special United States of America Typhus Commission, and finally the thorough mobilization of the field medical services who did the work of control.

From a strategical standpoint, the casualties from this cause among military personnel were negligible. Not a single death occurred from a disease recognized as one of the great pestilences of man, and characterized by a notably high fatality. Still more important was the absence of any interference with military operations at a critical time in the de-

veloping final offensive. The Army suffered no significant losses itself, nor was it called upon because of typhus to provide medical and other care to an overwhelmed civilian population of occupied territory.

Malaria Problem

Malaria in the Southwest Pacific constituted a strategic problem of equal importance to that of typhus fever in Europe. Advance planning had likewise been concerned with the provision of malaria control supplies, the development of method, and the training of personnel to combat this communicable disease. The early years of operations in that theater were attended with shipping difficulties. It is a function of theater authority to allot tonnage and a choice had to be made among the various classes of supplies assembled at ports of debarkation. The choice was made with the result that troops taking part in the early campaign in the Solomons and in New Guinea were without sufficient malaria control supplies and lacked specially trained control organizations.

The casualties from malaria were high. In the South Pacific Area, the attack rate for malaria reached 696 per thousand per annum in August of 1943. In the Southwest Pacific Theater, the attack rate early that year exceeded 400. Four American and two Australian divisions were incapacitated for periods of more than six months. At one time, more than 30 per cent of available beds in the Southwest Pacific Theater were occupied by malaria patients.

Subsequently the situation improved greatly. Survey and control units were assigned to field control, the necessary supplies were shipped, and strong emphasis was placed by command on the improvement of malaria discipline among troops. The morbidity rate for malaria declined steadily during the latter half of 1943, and in 1944, so that by 1945 the attack rate was less than 40 cases per thousand troop strength per annum in the better areas. The extent of the problem is indicated by the loss of 800,000 man days from malaria in the Southwest Pacific Theater in 1943, this constituting a fourth of the losses from all disease. The proportion was reduced to 5 per cent in 1944; and the old ratio of greater losses from disease than from battle casualties again returned to the more favorable circumstances which characterize modern warfare. The strategic problem was met, but after avoidable losses.

The principle in facing a problem where the influence of disease is involved is a question of how many effectives can be maintained in the line. Medical weapons and medical supplies may be as important a consideration as the number of troops made available or the basic military supplies of ammunition, rations, and motor fuel.

Non-battle Injury

The experience of the European Theater of Operations may be taken in illustration of the regularity with which losses from this class of military casualty occur. Irrespective of whether operations relate to a time of training or to an active campaign in the field, the number of men lost by reason of non-battle injury is subject to little variation (Figure 7). The rate for the year 1944 was actually the best of the four years despite the autumn campaign in France and appreciable losses in the last two months of that year from trench foot, a major item in the category of non-battle injury. The excess rate for 1945 was almost wholly of that origin and yet the rate for the year was not greatly in excess of the first training year of 1942.

The attack rate for disease was much greater than that for non-battle injury, varying from a ratio of eight to one in the most unfavorable year to a relation-

Non-battle Injuries, Admissions to Hospitals and Quarters, Total Army, Continental United States, and Theaters of Operations, U.S. Army, Cases and Rates per 1000 Strength, per annum, by years, January 1942 to June 1945, inclusive.

Theater	Total		1942		1943		1944		1945	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
Total Army	1921342	91	294288	96	624849	93	666209	89	335996	87
Continental United States	987163	75	230366	91	412655	80	270536	67	73606	51
Total Overseas	934179	116	63922	125	212194	133	395673	113	262390	108
Alaska	41341	152	7619	152	20852	182	10558	127	2312	99
Southwest Pacific	166758	138	11963	178	33317	171	77046	139	44432	114
Mediterranean	179581	133	2040	96	64075	149	91063	138	22403	93
North America	21160	125	6330	156	9747	136	4065	96	1018	65
Africa-Middle East	14679	113	928	162	7469	140	4712	99	1570	66
Pacific Ocean Area	111366	107	15379	104	33590	114	43648	111	18749	90
European	335445	105	8023	110	26497	100	143201	97	157724	115
China-Burma-India	31541	95	460	81	3893	84	15385	96	11803	98
South America	32308	93	11180	109	12754	105	5995	70	2379	61

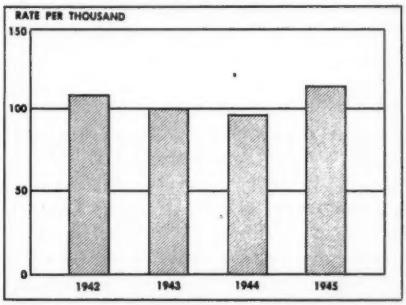
Source: Medical Statistics Division, Office of The Surgeon General, War Department, Washington, D. C.

Table 3.

ship of five to one under the most favorable conditions (Figure 4). The difference between the two conditions is less marked when judged on the basis of the resulting non-effectiveness, since the period of disability from injury is longer than that for disease (Figure 2, page 33, March issue).

A comparison of morbidity rates for non-battle injury in the several theaters of operation shows a variation in experience considerably less marked than for disease (Table 3). Without exception casualties from non-battle injury were more frequent in theaters of operation than in continental United States, since no theater approached the average rate of 75 per thousand strength per annum established by troops of the Zone of the Interior. The influence of environment on the record attained was strongly evident. The Alaskan Theater with one of the best rates for disease had the highest rate for non-battle injuries, and conversely the China-Burma-India Theater with a rate of 929 per thousand per year for disease had the

Figure 7.
Non-Battle Injuries, Admissions to Hospitals and Quarters, European Theater of Operations, U.S. Army, Rates Per Thousand Strength Per Annum, February 1942 to June 1945, inclusive.



admirable record of 95 for non-battle injuries.

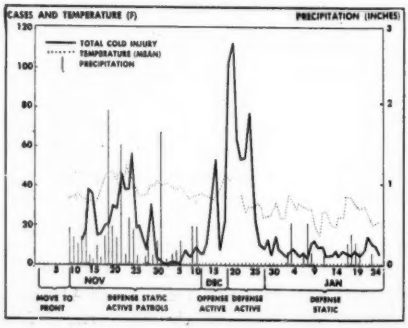
Again, it is to be emphasized that no direct comparison between theaters can be made on the basis of these crude rates, because environmental and tactical conditions varied greatly. The important consideration is that these are in large part preventable conditions, and the rate under a given set of conditions can be influenced by the extent to which preventive measures are applied. The important component conditions of motor accidents and trench foot are decidedly in point.

Trench Foot

Trench foot in Attu, in Casino, and in the European Theater was a strategic problem of preventive medicine. The condition is an accompaniment of campaigns in wet-cold climates. In a given week in November 1944, 3,000 cases occurred in a single field army. In the months that followed, all combat troops of the European Theater were involved in varying degree. Field control was strictly an epidemiologic problem. Attack rates were shown to bear a definite relationship to the existing tactical situation. The risk varied as troops were on the offense, engaged in holding actions, under static conditions, or in rest areas. The kind of weather exerted an influence, likewise the character and amount of clothing and equipment. Qualities of the terrain could be demonstrated as a contributing factor, and of decided significance were the methods of management of troops. The incidence was by no means uniform. Certain armies, divisions, regiments and even battalions suffered inordinately in comparison with neighboring units operating under similar environmental circumstances. Riflemen were affected beyond all other occupational army groups, with more than 90 per cent of cases in this important component of the ground forces. The importance of this circumstance becomes evident when translated into terms of effective combat strength. A loss of 15,000 men from trench foot is seemingly the equivalent of one division and yet with 4,000 riflemen to a division and 90 per cent of the casualties within that group, the actual loss is four effective fighting divisions. The contributing causes of the condition and its incidence varied from place to place and from time to time. The principle of prevention is evident—an epidemiologic analysis of cause and effect (Figure 8) and a fitting of control measures to the individual circumstances.

Three times in the course of World War II, trench foot was encountered as a strategic problem and three times the losses were beyond calculated risk or reasonable expectancy. The invasion of the Japanese mainland would have presented a fourth situation, for the environmental conditions predisposed in a degree comparable to those of Italy and Northwest Europe. The combined opinion and effort of several arms and services went into the development and initiation of a plan which included the chief considerations of clothing and supplies, education of the

Figure 8.
Cold Injury in an Infantry Division, Frequency of Cases by Types of Military Operation, Temperature Degrees Fahrenheit and Precipitation in Inches.



individual soldier, the organization of special trench foot control units, and the administrative action of command. What was done never came to test, for hostilities ended before Japan was invaded. It behooves any future planning group concerned with a campaign in wet-cold climates to review this plan.

Summary

The strategic influences of disease on military operations are understood to include those medical problems continuously present and existing by reason of environmental or ecologic influences peculiar to a given situation. They may represent problems of disease, as with malaria; or of injury, as indicated by the continually existing accident problem. Conversely, strategical problems may be temporary and unusual, but not unexpected. They are the carefully defined results of an anticipated change in ecologic equilibrium. When American soldiers set out for the Normandy beaches in June 1944, difficulties in respect to trench foot were certain to occur the following autumn and winter, with the extent of losses dependent upon the adequacy of plans and the sufficiency of supplies for prevention and control. The counterpart in respect to disease is illustrated by typhus fever in Europe, existing under conditions incident to war although a disease normally absent.

Medical problems of tactical significance are those relating to the immediate situation. They may be so far-reaching as to involve most of the members of a military community. More commonly they are localized and sometimes highly individual. Under all circumstances they require prompt analysis of the situation and the institution of specifically directed control measures. The suddenly developing epidemic of influenza in Great Britain in 1943 was an example of a widespread tactical problem in military preventive medicine. The more usual illustration was that of an excess accident rate in a Quartermaster depot, the abnormal prevalence of venereal disease at a port of embarkation, or the series of peculiar illnesses at a chemical warfare service impregnation plant. These are the problems of the day and find complete analogy in similar occurrences of civilian communities.

The utilization of the medical services of a combat force to meet the strategic and tactical problems introduced into military operations by reason of disease requires more than adequate care of the sick and wounded. Many of the more important problems are essentially matters of preventive medicine. They are of two kinds: the group problems of the military community, and the health problems that relate to the individual soldier. The group problems extend much further than the control of epidemics and the management of communicable disease. Under modern conditions, the infections become progressively less important and concomitantly non-communicable processes attain increasing significance—injury, accidents, trench foot—and a variety of nutritional, neuropsychiatric, and other diseases, unrelated to communicability and yet of epidemiologic importance.

The health problems of the individual soldier rate equal importance with strictly group problems, since clothing, housing, nutrition and psychologic management act importantly in decreasing the slow attrition from disease and disability, which if exaggerated can approach in losses those that result from epidemic disease.

A basic principle in minimizing the adverse strategic and tactical influences of disease on military operations rests in a protective maintenance applied to men as well as to machines. And that is preventive medicine in its simplest terms.

Dissemination of Intelligence

Lieutenant Colonel M. L. Green, *Field Artillery*
Instructor, Command and General Staff College

General

MILITARY intelligence, once obtained, is valueless unless it is disseminated. Of course, certain intelligence can be held or filed temporarily, but almost invariably it must eventually be transmitted to someone for use. Otherwise, a great part of the intelligence effort is wasted, and the G-2 fails in the proper discharge of his primary function.

Importance

Dissemination of military intelligence operates in all directions at once. It must flow forward, rearward, and laterally. It requires the constant attention of all intelligence personnel to insure that intelligence reaches the individuals or units concerned in time to serve their purposes.

Let me cite an example from the European Theater of Operations. In the early days of September 1944, the Allies had broken out of the Normandy Beachhead, had flooded France with troops, and were pushing fingers of steel into Belgium and Holland. The forward elements of one of those fingers, the 1st Infantry Division, gathered information that a large force of Germans was moving across Belgium from the coast eastward to man and hold the Siegfried Line against Allied attack. The resulting intelligence was quickly disseminated laterally and forward until it had reached all commanders of the 1st Infantry Division, the 3d Armored Division, and elements of the VII Corps which were reinforcing those divisions. Those American forces cut the German force of about four to five divisions, reinforced, into ribbons and prevented reinforcement of the Siegfried Line. Dissemination in this case had been properly handled.

What, then, is a proper definition for "dissemination of intelligence"? Briefly, it is: "Right dope, right place, right time." More formally we could say: "Dissemination is the timely distribution of intelligence, in suitable form, and in needed detail, to all authorized persons and agencies who can use it." This definition applies regardless of the unit and regardless of the direction of flow of intelligence, be it forward, sideward, or rearward.

At the combat level, it becomes apparent that certain criteria can be applied to dissemination. They are *timeliness*, *brevity*, and *clarity*.

Prompt dissemination helps win battles, helps save lives. Tardy dissemination is of little value to anyone. In this Atomic Era, we have an even greater need for rapidity in our dissemination of intelligence.

Likewise, brevity and clarity help to focus the receiver's mind on the essential intelligence that he must know. All reports concerning dissemination

should be written so as to highlight the important points.

Forms of Dissemination

Once we have grasped the import of dissemination, it is logical to consider next its methods. "What are the forms and media of dissemination?"

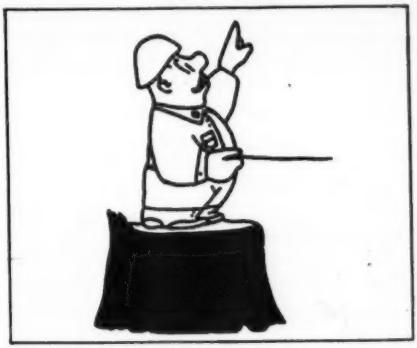
In the broadest terms, dissemination takes one of three forms: messages, conferences, or intelligence documents.

Messages are quite familiar because of their wide use in all military activities. They are used to disseminate a large volume of combat intelligence. They are of all kinds—regardless of whether they arrive by messenger, or are transcribed after being received by telephone or radio.

The second form is the *conference.* These are either formal or informal. Representative of the formal type is the *staff conference,* wherein the G-2 presents pertinent facts concerning the enemy situation, capabilities, and characteristics of the area to the Commander, to the other members of the Staff, or to visiting officers. The informal conference is exemplified by personal contact between a G-2, or his representatives, and others, such as between a Corps G-2 and a Division G-2. This simply consists of a spontaneous, personal discussion of intelligence matters. Conferences are an effective form of dissemination because of the personal-touch element.

The third form of dissemination is through numerous types of *intelligence documents.* This is the best way of insuring dissemination of detailed intelligence to all concerned. These documents vary according to the level of the producing headquarters and according to their ultimate use.

CONFERENCE



The object of dissemination of intelligence is to insure that the necessary information reaches the individuals or units in time to be of use; the ultimate beneficiaries are the troops themselves

(1) *G-2 Periodic Report.*—Perhaps the most significant of these documents from the point of view of dissemination is the G-2 Periodic Report. Its importance lies in the fact that it is the most natural vehicle for insuring continuous and comprehensive dissemination to all units. It contains an initial brief summary of the enemy situation and the enemy capabilities and then goes into considerable detail on each of its many component subjects. Thus, it most closely approaches the ideal in dissemination—brevity for the busy commander and detail for the intelligence specialist.

(2) *Intelligence Estimate.*—Next is the Intelligence Estimate. This document is very important in itself, since the intelligence contained is sometimes considered as the "cream" of combat intelligence. A G-2 who cannot make a sound estimate is not a good G-2, since the achievement of his primary function de-

pends largely on the accuracy of his estimate. The estimate is not given "wholesale" dissemination, although pertinent material therefrom is included in and disseminated through other documents.

(3) *Operations Order.*—From the Estimate, we proceed to the Operations Order and pause at Paragraph 1a. This paragraph gives the troops a resumé of the current enemy situation to their front. It is also frequently the prelude to the Intelligence Annex to the Operations Order which contains more explicit intelligence as well as instructions to collection agencies. The Annex may be issued by a division or higher unit when it can be distributed in time to be of use.

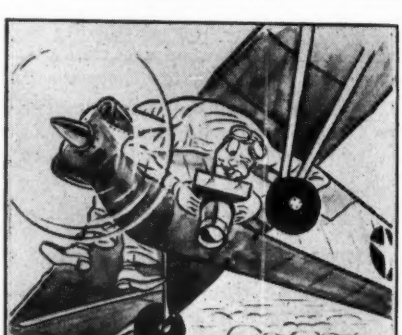
(4) *Maps.*—In the War Room of the headquarters, the G-2 has an excellent spot from which to disseminate intelligence. The Commander, staff officers, subordinate commanders, and many official visitors move in and out of this room daily. Two documents lend themselves to this mode of dissemination. The first is the G-2 Situation Map and Overlay. The second is the Order of Battle Map and Overlay. These documents depict in graphic form the location and disposition of enemy forces and installations. They lend themselves readily to rapid interpretation of intelligence, thereby saving time for the busy officer.

Then we have other documents which are useful for planners as well as for the commanders during the actual operation.

(5) *Terrain Studies.*—Terrain Studies furnish detailed information on the terrain. Their purpose is: first, to present to the commander a description and an interpretation of the terrain under consideration as it affects his own mission and the capabilities of the enemy, in order that he may have a further basis for arriving at a decision, avoiding surprise, conducting a maneuver, or formulating a plan of operations; and second, to assist the troops in the execution of their assigned mission.

(6) *Soil Map.*—Soil maps are important considerations to be weighed in estimating enemy capabilities. The character of the soil of an area is a very important factor. Its trafficability will often determine the success or failure of a military operation, particularly where cross-country use of motors and armor is involved. The Air Weather Service is responsible for furnishing this data.

(7) *Photo Interpretation Report.*—The Photo Interpretation Report is a necessary adjunct of the aerial photograph. It furnishes the translation of the picture and is an analysis of terrain and enemy installations as well as a supplement to the Terrain Study.



(8) *Prisoner of War Interrogation Reports.*—The information included in Prisoner of War Interrogation Reports—once a true evaluation has been made—becomes intelligence which is often of great value as the informer has actually operated in the situation he describes.

(9) *Intelligence Bulletin.*—The Intelligence Bulletin contains helpful hints concerning enemy equipment, weapons, tactics, and strategy, as well as tested methods of overcoming the enemy in battle.

Then we have certain miscellaneous documents.

(10) *Technical Intelligence Summary.*—The first of the miscellaneous documents is the Technical Intelligence Summary. It offers a complete resumé of intelligence on various subjects, such as enemy weapons, equipment, technical methods, etc. They are intended for use only by the interested specialists, due to the comprehensive scope of their contents.

(11) *Translation of Captured Documents.*—Translation of captured documents, when properly evaluated, furnish accurate and valuable intelligence concerning the enemy.

(12) *After-action Reports.*—The After-action Reports chronicle the unit's record in battle and furnish excellent material for training and for planning future operations. G-2, as well as other staff sections, contribute a portion.

(13) *Special Reports.*—These deal with particular enemy tactics, personalities, etc.

Finally, there are Approach Maps, Sketches, Recognition Pamphlets, and many other documents just as important in their field but too numerous to mention.

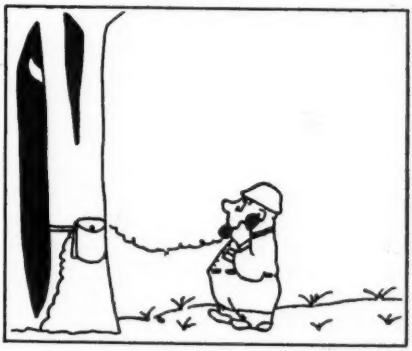
The thing to remember is that, regardless of the form G-2 chooses for dissemination, he must insure that it gets to the right person at the right time. A commander's decision must be based on reliable intelligence data. This is true whether the commander is a platoon leader or an army group commander. He must know his enemy before he can deal with him effectively.

These messages, conferences, and documents simplify the work of the G-2 in the sense that he has a broader choice of vehicles. However, he must learn the meaning and capabilities of each before selecting the proper document. Some intelligence may be best disseminated through the G-2 Periodic Report, while other intelligence might best be disseminated through a Terrain Study. Another may call for the use of fragmentary messages. Thus, the problem of the G-2 is to insure timeliness by the proper selection of the appropriate form.

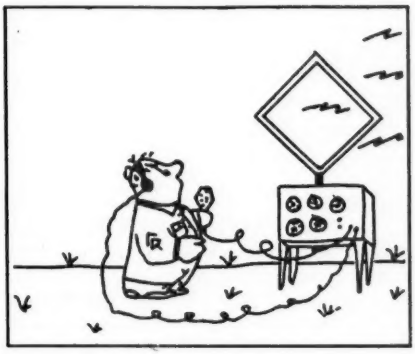
Means of Dissemination

Now that we have considered the forms of dissemination, let us briefly examine the means or media. They are the familiar means of communications characteristic of virtually all military transmission. First is the messenger, courier, or message center service. Second is the telephone or wire. Third is radio. They are the commonplace means in our military life.

TELEPHONE



RADIO



However, that tends to make them all the more important to the G-2. If the G-2 is able to have a wide selection of his forms for dissemination, he must have all three means at his disposal.

There are two channels through which dissemination may flow: command channels and the intelligence channels. Command channels are, naturally, from bottom to top, from commander to the next commander. Intelligence channels follow a similar pattern. They are from G-2 to G-2, but go up, down, and laterally at the same level.

Command channels permit everyone in the chain of command to have access to the intelligence. On the other hand, intelligence channels cut red-tape and save time as the intelligence is passed directly from G-2 to G-2.

Exceptional Dissemination

Information is normally processed before it is disseminated as intelligence. However, information may be disseminated without processing if dictated by urgency. A good example of this exceptional dissemination of information is the flash warning, such as —"Air Raid, fifty planes, from the southeast at Leavenworth, 1400 hours." Here the time factor makes it imperative to dispense with normal processing, and the information is passed on immediately.

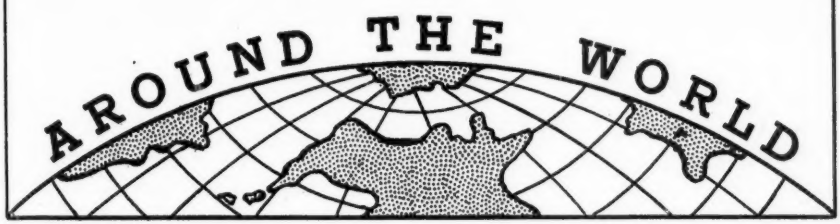
Conclusion

In conclusion, I wish to underscore the central thesis of the subject. The object of dissemination of intelligence is to insure that it reaches the individuals or units in time to be of use. Adequate and timely dissemination insures that lower, adjacent, and higher commanders have the necessary data to keep their estimates current. Thus, dissemination permits the incorporation of intelligence into a continuing intelligence estimate.

The ultimate beneficiaries of dissemination of intelligence are the troops themselves.

In reference to his article entitled "MATS Headquarters Organization," which appeared in the March 1949 issue of the MILITARY REVIEW, the author, Colonel Robert E. Cron, Jr., writes as follows: "A recent regrouping of a portion of the staff functions of MATS headquarters occurred too late to be incorporated in this article. However, the distinctive features of the two-deputy system, with each director reporting to both deputies, has been retained."

MILITARY NOTES



GERMANY

Noise as a Weapon

Since the days of Julius Caesar, noise has been used for camouflaging troop movements and tactical maneuvers. In 1940 the Germans successfully added sirens to their *Stuka* bombers, producing confusion in the formations exposed both to a hail of lead and to noise. A German scientist also attempted to make noise a lethal weapon.

A parabolic mirror of 3.2 meters diameter was directed toward the enemy. In its focus was placed a chamber and a resonator whose opening was turned toward the center of the mirror.

In the interior of this chamber, which was supplied with acetylene or methane and oxygen through various tubes, the explosive mixture was ignited, an explosion produced and the pressure of the sound wave reflected, as in the case of light, along the axis of the mirror. Inside the chamber, which was about one-fourth as long as the length of the sound wave emitted, stationary waves were formed which produced spontaneous explosion of a second charge, etc. Thus, with a frequency of 800 to 1,500 times per second, powerful pressure waves (one millibar at 60 meters) were emitted which were capable of stunning an assailant and perhaps killing him if he was exposed for about a minute.—*L'Armée Francaise.*

BRAZIL

Iron and Manganese

Brazilian exports to the United States of militarily important metals such as iron ore and manganese may be greatly increased. This may be a result of negotiations in progress between United States steel companies and Brazil and studies undertaken by the Joint Brazil-United States Technical Mission.

Steel company negotiations indicate that Brazil might be called upon in 1949 to supply to the United States a minimum of 500,000 tons of iron ore and 200,000 tons of manganese. Part of this material might be exchanged for United States coal and the remainder paid for in dollars.

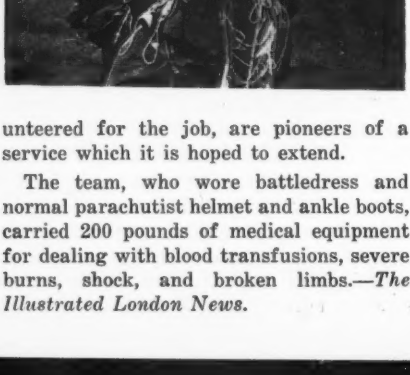
Brazil is in good position to supply the United States with as much iron ore and manganese as might be required. Her iron ore reserve has been estimated at a minimum of 15 billion tons and may be the largest in the world. The manganese reserve amounts to more than 40 million tons, compared to an estimated one million for the United States. Moreover, it is high-grade, while the United States ore has a low manganese content.

Iron ore from Brazil is famous for its high iron content. That from the Iron Mountain of Itabira runs approximately 69 per cent pure and is found in the center of a 200 mile belt.—*Brazilian Bulletin.*

GREAT BRITAIN

Parachute Medical Team

A medical team dropped from a C-47 aircraft recently in a demonstration of how first aid can be rapidly sent by air to casualties which cannot be quickly reached on the ground. The team consisted of a medical officer, three orderlies, an operating-room assistant, and four RAF nurses. These nurses, who all volunteered for the job, are pioneers of a service which it is hoped to extend.



Above, medical team ready inside plane; below, first nurse to reach the ground.

The team, who wore battledress and normal parachutist helmet and ankle boots, carried 200 pounds of medical equipment for dealing with blood transfusions, severe burns, shock, and broken limbs.—*The Illustrated London News.*

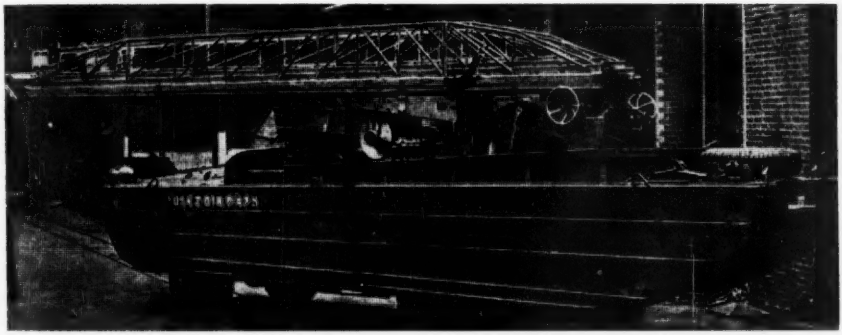
Submarine Rescue Vessel

HMS *Reclaim*, the British Navy's first specially designed deep-diving and submarine-rescue vessel, recently concluded trials on Loch Fyne. Her complement includes 15 divers and a doctor with specialist knowledge of underwater physiological problems. The ship's equipment includes two submersible decompression chambers, one of these having three compartments. This obviates the normal requirement for a diver's slow ascent to reduce pressure. Divers wearing flexible suits with special attachments can be lowered to 300 feet. An armored suit lowered by derricks makes possible a descent to 500 feet. There is an observation chamber with telephone communication to the surface which can be lowered to a depth of 800 feet. The *Reclaim* should prove of particular value in connection with submarine salvage, but for one vital handicap—speed. It is understood that her full speed is only 13 knots and that her propulsive machinery may require as much as 24 hours' notice to be ready. Speedy arrival at the scene of an accident is an essential preliminary to successful salvage, and certainly an indispensable requirement if life is to be saved. It would be a misfortune if the excellent equipment of the *Reclaim* were wasted by arriving too late at a scene where its use would save precious lives.—*The Fleet.*

Gas Turbine Warship

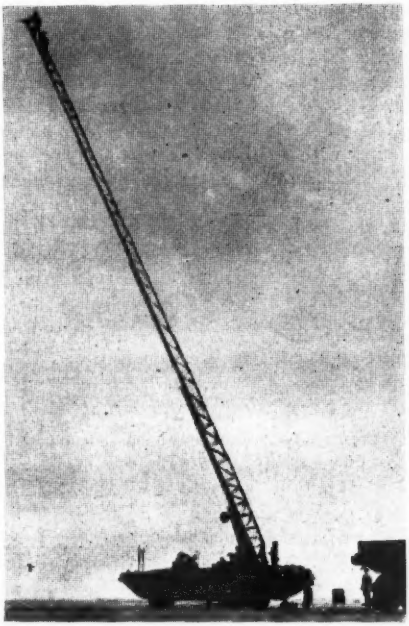
First ocean-going warship powered by a gas turbine engine is being built secretly in a Northern shipyard. Her engines incorporate the very latest marine gas turbine design. Operational gas turbine warships could get under way almost at once without the long delays of getting up steam; they would consume less fuel and would have increased cruising range.—*The New York Times.*

Seaborne Scaling Ladder



Above, DUKW fitted out as cliff-assault craft with ladder to be raised by winch power from the vehicle; below, right, the ladder extended to full length with two men at the top showing how machine guns would be employed over the top of a cliff.

Throughout the history of warfare, attempts have been made to devise some means of surmounting obstacles confronting the attacker. One of the more successful of these attempts is the seaborne scaling ladder developed to assist the Normandy invaders of World War II in overcoming certain German gun positions which menaced the landing beaches. These strongpoints were impregnable from the landward side so had to be assaulted over the cliffs surrounding them. To do this, some method of scaling the cliffs had to be readily available to the Allies.



The vehicle finally developed for this task is simply a DUKW upon which has been mounted a sectional ladder similar to those used by firefighting crews. The ladder has four telescoping sections which, when fully extended, reach a height of 100 feet. The top of the ladder was modified to carry two machine guns and ammunition drums instead of firefighting nozzles. Special jacks were mounted at the sides of the DUKW to provide stability when the ladder was in use.—*Soldier.*

USSR

Civilian Training

The first report on the progress of the army phase of Soviet Russia's revamped civilian military training program became available recently. It indicates that substantial progress has been made in putting the program on a realistic basis, but it expresses disappointment with the results thus far.

While it is clear that good beginnings have been made since the reorganization of the Soviet voluntary civilian defense set-up last May, it appears that such achievements as the army program can boast of were scored by certain units of the civilian organization and do not yet represent results on a mass basis.

Members of the All-Union Voluntary Society for Assistance to the Army (DOSARM), took part in many marksmanship, horsemanship and motorcycle riding contests of the society and competed in All-Union contests with the teams of factories, collective farms, and localities.

Its marksmen, formerly trained in range firing with small-caliber weapons, proved to be "quite inadequately trained in rapid firing, shooting from rifles with a telescopic sight, and firing at moving targets in the field." They made "a poorer showing" in these drills than in anything else.—*The New York Times.*

Midget Subs

It is reported that the Soviet Navy is showing much interest in midget submarines. These are said to have been evolved by German technicians from types developed by the Germans during World War II. They have a crew of two, carry two torpedo tubes, have a displacement of 80 tons, and a length of 36 feet. It is claimed that they have a cruising range of 620 miles, and they are being built at Nicolaieff, Odessa, and Kronstadt.—*The Fleet.*

FRANCE

Permanent Military Committee

The new French Military Committee is not a staff; it is what is called a "brain trust" in other countries. The Committee is a body of high-ranking officers who enjoy the confidence of the President of the Council of Ministers and with whom he consults when he has a general order to give or an important decision to make. The President states the problem and the counsellors discuss it in his presence; no minutes are kept, there is no voting; each gives an opinion and formulates objections. Finally, after hearing the suggestions and examining the hypotheses, the President withdraws and makes his decision. The Committee is not, therefore, a decision-making body; it is a consulting body with no fixed membership. The President may appoint whomever he wishes to the Committee.

Provided with these two tools — the "brain trust" which assists him in the formulation of his general directives, and his staff which puts them into operation—the President of the Council is able, with a full understanding of the pertinent facts, to fulfill the mission given to him under the constitution.—*Revue Militaire Suisse,* Switzerland.

CANADA

Industrial Defense Board

The Canadian government has established an industrial defense board to advise the government and its military authorities on all matters relating to the industrial war potential of Canada. The board consists of prominent representatives of industry, defense, research, the armed services, and others who can help in the preparation of plans for industrial production in the event of war.—*Journal of the Royal United Service Institution.*

UNITED STATES

Standardized Clothing

A committee, composed of top-ranking Army, Navy, and Air Force officers with authority to make final decisions for their departments, is working on the standardization of clothing and personal equipment for the armed forces.

An exhibit of 400 items, representing a total cost of nearly $247,000,000 for all armed forces requirements during the fiscal year 1949, has been set up by the three departments at the Army Quartermaster Depot near Alexandria, Virginia, to assist the committee and its technicians in making selections for standardization.

The exhibit consists of such items as undershirts, belts, fatigue uniforms and caps, boots and shoes, stockings, socks, blankets, flying equipment, goggles, nurses uniforms and a wide variety of other clothing and equipment. Each item is tagged with information as to its use, specifications, cost, annual gross requirements per 100,000 troops, how it differs from items of the same type used by other departments, and industrial capacity to produce the amount required.

Uniforms, insignia, and distinctive items of outer clothing which show to which service the wearer belongs, are not being standardized, except that studies are being made of materials.

After the three committee members have decided that an item will be standardized for use by all services, the Munitions Board Standards Agency will draw up specifications which will be used by the armed forces for all procurement.

When present studies are completed, it is expected that consideration will be given to other categories of equipment and supplies, such as kitchen equipment, furniture, refrigeration, machinery, electrical apparatus, leather products, and office machinery.—National Military Establishment.

Guided Missile Terms

The National Military Establishment issued recently a list of terms from "acceleration, axial" to "zoom" in a 72 page "Glossary of Guided Missile Terms" that represented the first publication of a language primer to be used by experts of all three armed forces.

Among the terms devised for the guided missile specialist is a suggestion that such a projectile, either a weapon-carrying rocket or a pilotless plane, might some day be equipped to recognize its own target.

This eventuality is implied by the phrase "guidance, homing, active," which is defined as "a system of homing guidance wherein both the source, for illuminating the target, and the receiver are carried within the missile."

The definition would seem to indicate that a guided missile could be so equipped, with highly secret and perhaps yet undeveloped electronic devices, to recognize the target by an image or picture installed within it.

This technique would appear to utilize the principles of both television and the so-called "electric eye."

A close relative of this missile is implied in the term "guidance, homing, passive," described as a "system of homing guidance wherein the receiver in the missile utilizes natural radiations from the target."

These radiations could be heat, light, or some other element to which an electronic device could be made sensitive.

The best-known guidance of missiles, such as those controlled by radio, is termed "command guidance," defined as "a guidance system wherein intelligence transmitted from an outside source causes the missile to traverse a directed path in space."—*The New York Times.*

Flush Deck Carrier

In 1952 or sooner the US Navy will possess the world's first 65,000-ton aircraft carrier.

The ship, named the USS *United States*, is designed to handle heavy, multi-engine bombers having a cruising radius of about 1,700 miles. The ship will have a speed of 33 knots, the same as that of the USS *Midway*, largest type carrier at present.

A feature of the flush-deck carrier permits use of a plane so large that its wings may actually jut out over either side. Use

	YEAR COMMISSIONED	STANDARD DISPLACEMENT TONS	OVER-ALL LENGTH FEET	BEAM WATER LINE FEET
LANGLEY	1922	11,050	542	65
LEXINGTON CLASS	1927	33,000	888	112
RANGER	1934	14,500	769	80
YORKTOWN CLASS	1937	19,900	827	96
ESSEX CLASS	1942	27,100	872	93
MIDWAY CLASS	1945	45,000	968	113
LATEST CARRIER	?	66,000	1,090	130

Chart comparing the new $124,000,000 flush-deck carrier with other US carriers.

of the super carrier would permit handling of large planes with great bomb-load capacity, reducing the number of missions required to destroy an objective. The radius of operation would become larger, permitting the carrier itself to remain farther away from a mission's objective. The ship will be built at the Newport News, Virginia, Shipbuilding and Drydock Company.—*All Hands.*

Arctic Breathing Device

Human survival in the coldest weather on earth may be made easier in the future if present expectations are fulfilled for a new gadget known as an Arctic breathing device. Designed to conserve the great amount of body heat and moisture lost through normal breathing, the gear is being developed by the Office of Naval Research.

Exhaled air is breathed into a mask covering both the nose and mouth and is carried into the center of the canister of the device through a tube. Although the canister is only a few inches in diameter, the exhaled air must go through several feet of passage within the canister before reaching the outlet valves. Before it reaches those valves, all the heat and moisture is extracted by the walls which separate the passages. The walls are mutual between the passages, with the result that inhaled air picks up the heat and moisture before reaching the body's respiratory system.

A test model has withstood trials with considerable success. If the finished device is as efficient as present studies indicate it might be, a basic problem in living wherever the temperatures range far below zero will have been solved.—*All Hands.*

Atomic Power Timetable

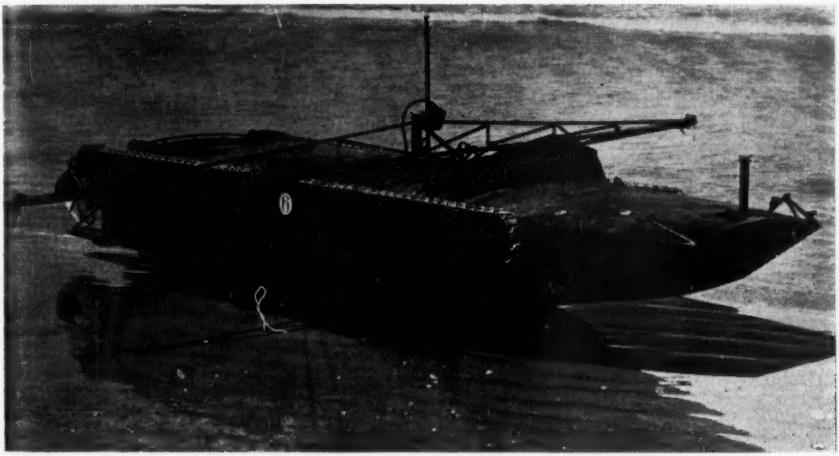
The Atomic Energy Commission in its latest report gives the following estimates as to when various phases of the atomic energy program may be realized:

1. Present power supply of world replaced in any considerable portion by nuclear fuel—20 years minimum, under favorable circumstances.

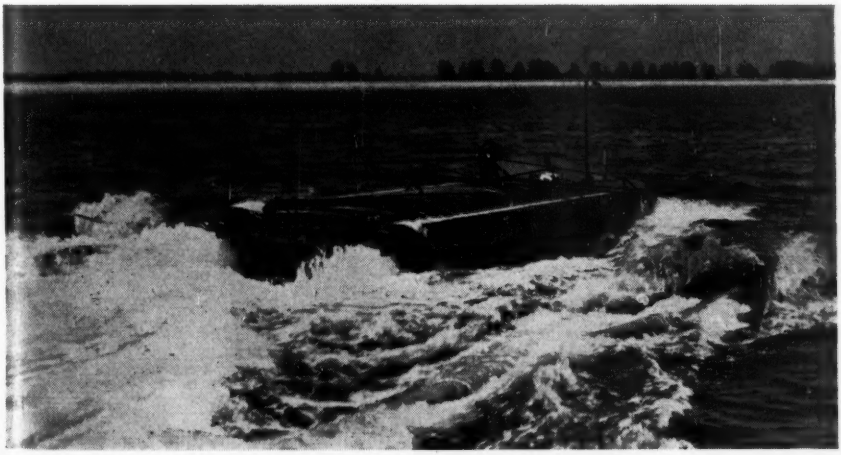
2. Fairly practical reactors, useful for special experimental purposes—within 10 years.

3. Two reactors especially built for power—within two or three years.—*Science News Letter.*

Clearing Beach Defenses



The Salamander, or "X-Craft," is one of the unmanned, remotely-controlled craft developed by the US Navy towards the end of World War II for use against underwater defenses or defensive positions on the beaches. The craft was heavily loaded with high explosives which could be detonated as desired, either in the water or after the craft went ashore on the tractor treads provided. Above, the Salamander on shore; below, the same craft underway in water.—US Navy photos.



Largest Test Gun

A 24-inch test gun, largest known gun of its type, has been placed in operation at the Naval Proving Ground, Dahlgren, Virginia, to test bombs and guided missile warheads and their fuzes.

The new gun will shoot bombs and warheads as heavy as 2,000 pounds against armor plate and concrete targets at supersonic velocities.The effect of the impacts on the missiles and their components will be measured and analyzed, permitting the armed forces to expand their work in the field of ordnance testing.

Modified 16-inch gun for testing bombs and guided missiles.—US Navy photo.

The gun is basically the sawed-off and otherwise altered barrel of a standard 16-inch gun, which had been damaged in combat during World War II. It is available to all the United States Armed Forces for tests.—Department of the Navy.

Historical Series

Okinawa: The Last Battle, the first combat volume in the 90-odd volumes of the historical series the *US Army in World War II,* has been published and can now be procured from the Government Printing Office, Washington, D.C. ($6.00).

Two volumes in the series covering organization and training of the Army in the United States have previously been published.—Department of the Army.

Satellite Research

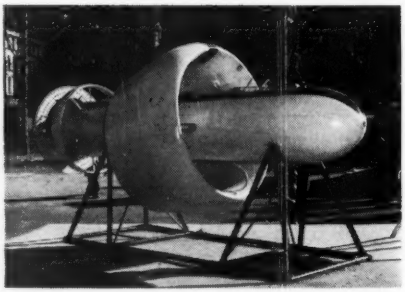
American scientists are studying the feasibility of creating man-made satellites to be utilized in the nation's defense.

A brief reference to the studies was made by the Secretary of Defense recently when he said: "The Earth Satellite Vehicle Program which is being carried out independently by each military service, was assigned to the committee on guided missiles of the Research and Development Board for coordination. To provide an integrated program with resultant elimination of duplication," the Secretary said in his first report, "the committee recommended that current efforts in this field be limited to studies and component designs."

Speculation was that a man-made satellite might be suspended in space, held in place by gravity from the earth and moon. Such a satellite might be utilized for controlling long-range guided missiles.—*Army and Navy Journal.*

Radio Controlled Missile

This is the finished model of the Air Force VB-10 "Roc," radio guided missile developed by Douglas Aircraft Corporation. The section encircling the body of the bomb is a circular wing which supplies lift to the bomb once it is released.



It is then maneuvered onto its target through remote control.—US Air Force photo.

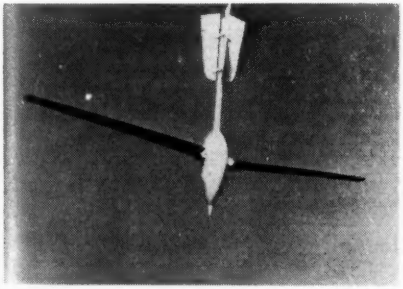
Amateur Radio

Emphasizing their value in World War II, the Army Signal Corps announced recently that after several years' absence from amateur radio bands, the Army has resumed direct contact with amateur operators through its "ham" station in The Pentagon, K4USA.

The Chief Signal Officer of the Army pointed out that amateur radio operators provide a valuable reserve of skilled personnel on which the military service can draw if necessary. In peacetime they frequently furnish vital communications in disaster areas where commercial facilities become inoperative.—Department of the Army.

Supersonic Parachute

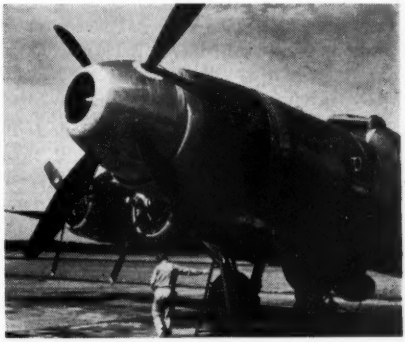
This spinning device, resembling a giant dart, is known as a supersonic parachute. It is one of several developed by General Electric for Army Ordnance. Expelled from V-2 rockets at altitudes up to 100 miles, the parachute reaches supersonic speeds before its vanes spread out and gradually slow the device, enabling it to land without damage to its delicate cargo. Just before the sharp spike on its nose embeds itself in the ground, the device has been slowed to about 27 miles per hour.

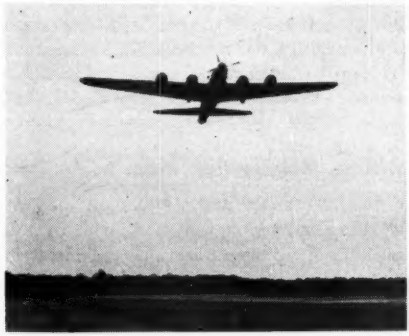


Ordinary parachutes ripped to shreds under similar conditions.—US Air Force photo.

Turbo-Prop Engine

A new, powerful, turbo-prop engine, the Wright T-35 (Typhoon), has been undergoing flight tests conducted by the Wright Aeronautical Corporation, as a part of the United States Air Force turbine development and test program. The engine,





Above, closeup of T-35; below, five-engine B-17 in flight.—US Air Force photos.

equipped with a Curtiss electric propeller with four blades, is mounted in the nose-section of a Boeing B-17 Flying Fortress, resulting in a five-engine, high-altitude, flying laboratory.—Department of the Air Force.

Scrapping Harbor Defenses

The Army is scrapping its historic harbor defense system, with its mighty but outmoded 16-inch coast defense guns.

Officials declined to say precisely which have been abandoned, but at least half a dozen were scheduled more than a year ago to be declared "surplus," with disposal of the equipment to be made as soon as possible. On this original list were harbor defenses at New Bedford, Mass.; Charleston, S. C.; Key West, Fla.; Pensacola, Fla.; Galveston, Tex.; and Columbia, Ore.

The coastal defense system had its beginning in colonial days. Now it must succumb to changing military strategy and weapons—planes, mobile artillery, and rockets. Defense planners now have to think first in terms of attack by air rather than sea, and land, airborne, and seaborne radar give the defenders long distance vision.

The outmoded coastal defense guns, together with the barbettes on which they are mounted, are ponderous hunks of steel. The Mark II gun tube alone weighs 307,185 pounds. Together with the shield and carriage, it totals 1,172,500 pounds. The projectile for such a gun weighs 2,100 pounds.—*United States Naval Institute Proceedings.*

Airline Mobilization Plan

The Air Force and civilian airlines are working on mobilization plans which would give the government virtual control of the 1,354-plane commercial fleet in event of war.

Both scheduled and non-scheduled carriers are working with Military Air Transport Service on the plans. MATS, which operates both Air Force and Navy transport units, has only some 540 cargo planes in service. The scheduled airlines are flying 1,054 planes, and non-scheduled carriers about 300.—*The New York Times.*

Aleutian Bases

The Department of Interior has assured the armed forces that they would get the Aleutian Island bases which they have described as necessary to "insure minimum national security."

Much of the territory sought by the armed forces was used for military purposes during World War II.

The Army and Air Force have asked for Adak Island, Great Sitkin, Shamya Island, portions of Amchitka Island, Atka Island, Umnak Island, Unalaska Island, and part of the Cold Bay area. The Navy wants Attu Island, Tanaga, Unalga, Aggatu, and other smaller areas.—*Armed Force.*

Low-Temperature Battery

Electric batteries that will function at 100 degrees below zero Fahrenheit are under development for the Army Signal Corps at Ohio State University. Experimental test cells which will operate at this temperature have already been constructed.

Batteries for use at extremely low temperatures have many military and civilian applications. High-flying airplanes encounter temperatures from 60 to 70 degrees below zero. Guided missiles and the battery-powered radiosonde, which is carried aloft to report weather conditions by radio, may meet even lower temperatures. Automatic ground-based weather stations in Arctic regions may be required to record and report the lowest temperatures found on the surface, and cold chambers used in research work sometimes have temperatures lower than any known that nature provides.—*Science News Letter.*

Journal Changes Name

The COAST ARTILLERY JOURNAL has been renamed the ANTIAIRCRAFT JOURNAL in conformance with the shift in emphasis which has taken place within that arm of the service.—*Antiaircraft Journal.*

A German View of the Soviet Air Force

Translated and digested by the MILITARY REVIEW from an article by Lieutenant General Herbert J. Rieckhoff (formerly of the German Luftwaffe) in "Flugwehr und -Technik" (Switzerland) August 1948.

WHEN the German army groups under von Rundstedt, von Kluge, and von Leeb attacked eastward in June, 1941, against the Soviet forces, a large part of the task fell to the *Luftwaffe*.

All strategic attacks, such as the ill-fated attack on England, were called off and the three eastern air forces under Löhr, Kesselring, and Keller were assigned the following missions:

1. Destruction of the Soviet air forces based in the western Russian operational area;

2. Direct support of the Army in the breakthrough of the Russian front.

The German *Luftwaffe* accomplished both these tasks, thereby contributing materially to the success of the summer campaign of 1941. When this ended, there no longer existed any organized units of the Soviet Air Force in western Russia. The Russian skies were cleared of Soviet fliers and the Germans then could begin air operations deep in Russia without meeting resistance. The *Luftwaffe* was free to attack Russian transportation and armament centers. Such operations, however, were not carried out other than a few relatively weak attacks on Moscow conducted for psychological reasons. They were not carried out because the striking force of the bomber formations was exhausted. Moreover, what remained of the German formations would be very quickly and urgently needed in the first of the autumn defense battles when the German Army struggled under the counterattacks of the Russians.

Though the first successes of the campaign appeared to confirm the negative estimates that the German Air Force General Staff had made of the Soviet Air Force, the signs from the autumn of 1941 on pointed more and more to the fact that the power of the Russians was still unbroken. Although the front recognized this error relatively early, the high command continued for a longer time to ignore these signs, and to deceive themselves about the relative strength of the German and Russian air forces. This attitude was rooted in vanity and further strengthened by success of the surprise attacks and numerous tactical successes.

There was no question but that Soviet air units had suffered severe defeat. At the time it seemed as though they had lost their strength permanently. But the German Air Force was also bled white by October 1941. The air battle between the

Russians and Germans entered a new phase in which the general air armament potentiality of the respective powers eventually would constitute the deciding factor.

Comparative Strength

Clarifying the German and Russian situations by a comparison, we see that at the end of 1941 the Soviets west of the Volga still possessed between 10 and 15 per cent of their original air strength. Hence, their units were numerically superior to the German. They were, however, inferior from the standpoint of technique and battle fitness. This was due to the following reasons:

1. At the beginning of the war in 1941, the Soviet Air Force found itself at the end of one armament period and at the beginning of another. Most of the planes at the front (*Rata* fighters and *Martin* bombers) no longer came up to the requirements of the time. However, the new aviation equipment which was intended to replace the old was not yet ready for front line use. To a certain extent, it was still in the test stage, and production by assembly-line methods had not yet started. On the other hand, the German *Luftwaffe* had by that time attained high technical and tactical efficiency.

2. The leisurely efforts toward the reinforcement of the Soviet Air Force for 1942 were interfered with by the German attack. At that time, neither the ground organization, the training service, nor the industrial capacity was adequate for the needs of the untrained reserves of personnel which had already been mustered into service with the Air Force. Despite the wealth of Russian manpower, it was not possible to replace the high initial Russian losses with the desired speed. Rigorous curtailment of training periods and programs proved to be dangerous experiments.

Matters were better for the Germans at this time than for the Russians, but they, too, were no longer able to maintain the strength of their formations for very long without a let-down in the quality of training. The German *Luftwaffe* would have required at least six months of complete rest after the autumn of 1941 to bring itself again anywhere near its condition in 1939. But instead of this it was forced to exert itself to the utmost to prevent a breakthrough by the Russians and the total destruction of the German Eastern Front during the winter of 1941-1942. The German *Luftwaffe* never fully recovered from this "load-test." Nevertheless, until 1942, it made up for its numerical weakness by its high degree of combat efficiency. This was the result, first, of the experience gained in earlier campaigns. German combat aviation had gone through a hard school on the fighting fronts. The crews that had survived, that had held their own against the toughest air adversaries, the British, were definitely superior to the Soviet fliers who lacked battle experience.

But that was not all. The natural characteristics required of an air fighter are not found in equal degree in all nationalities.

The Russian, for example, possesses an entirely different attitude toward death than the Western European. He knows no fear of death. This explains his calm in attack, and his disregard of the losses occurring about him. In the air, he also attacks bravely in close formation. Fighter tactics, however, call for individual combat. Here the Russian's closed formation is broken up, and alone he does not fight as hard or determinedly for his life as, for example, the German. His *nichevo* ("it doesn't matter" attitude) dominates his nature more strongly than his instinct for self-preservation. The suppression of individualism by the Soviet system is evidenced in this defect, yet we are not warranted in assuming that this indicates any general lack of cour-

age and determination. Yet it is undeniable that men who are always forced to think and act collectively are lacking in spiritual self-sufficiency.

These circumstances explain why the impression existed at the end of 1941 that the German Air Force was superior to the Soviet. It was emphasized by the skill which the German commanders showed in concentrating their forces at the points of main effort, by which means they temporarily obtained local superiority. After the autumn of 1942, however, German effectiveness sank steadily, for the following reasons:

1. The best of the German forces, trained in time of peace, were exhausted. The reserves lacked intensive training and experience.

2. Interruptions and interference with the training of replacements by the formation of large transport formations for use in Norway, Holland, and Crete.

3. The German *Luftwaffe* did not prove to be "winter-proof" on the eastern front. From the technical and organizational standpoints, it was not prepared to meet the demands of winter warfare. Its losses accordingly increased and its power of attack diminished.

4. With the assumption of supreme command by Hitler, the army acquired a stronger influence in the employment of the *Luftwaffe*. The air formations were forced to adopt ineffectual and costly combat tactics, such as a far-reaching division of the forces into small units distributed over wide stretches of front.

5. As a result of the circumstances mentioned in items 2 and 3, losses were further increased. Reserves of personnel and matériel were inadequate. The units were greatly weakened; the lack of quiet periods made it still more difficult to build them up again. Before major operations, units were brought up to sufficient combat strength with great difficulty, but they were again quickly worn down by losses of personnel and equipment.

Meanwhile, the creation of Soviet Air Force units was likewise progressing slowly. The stubborn struggle for air superiority continually dissipated their strength. The requirements of the broad fronts and the rear areas were very great. The defense battles, as well as the first counterattacks, brought heavy losses.

Manufacture of modern planes in Russia which began about the same time that the German *Messerschmidt* appeared, was not sufficiently under way. Nor was the personnel problem solved satisfactorily as yet. Powerful assistance on the part of the United States was necessary to successfully counter the German advantages of quality and local numerical superiority.

Basic Organization

In this situation, the Russians had to decide what line their air armament efforts must take. The German *Luftwaffe* owed its operational successes in the West to a powerful fleet of bombers. In direct support of the Army, their *Ju-87* dive-bomber had won recognition from both friend and foe. Still, in the autumn of 1942 bombers and dive-bombers formed the nucleus of the *Luftwaffe*. However, strong fighter formations were indispensable for the protection of the rear areas for repulsing enemy reconnaissance aircraft, and for escorting air attack formations. The two-motored *Me-110* type, at first conceived as a fighter, and then employed as a light bomber and low-level attack plane, had to be employed in reconnaissance and night fighter work since they no longer met the requirements of their original mission.

From the crisis in 1940, the Allies had learned that in the face of a powerful and aggressive adversary, powerful fighter forces were a matter of prime necessity. Yet even the rapidly growing capacity of the Anglo-American air industry did not

permit them to carry on the construction of a fleet of bombers at the same time.

The Russians therefore had ample opportunity to draw parallels from the experiences and views of their enemy and their allies. After their front line units had been broken up in the summer of 1941, it was evident that their most urgent need was the reorganization of their fighter and reconnaissance units. In the face of German air superiority, this work proceeded very slowly with continual setbacks and heavy losses. But in spite of this, an effort was made, at first, to reconstruct their bomber fleet along with lighter aircraft, the former having been poorly equipped in 1941, and very shortly destroyed. It soon became apparent, however, that this attempt to build both fighters and bombers was faced with these obstacles:

1. The enormous amount of time and material required exceeded the total capacity of the Soviet personnel employed in the equipment and supply organization;

2. The attempt was accompanied by no success but, rather, reverses:

3. The plan seriously curtailed attainment of the desired quotas of light units, both as to production and training.

These considerations alone would have been sufficient to cause the Russians to abandon their efforts to reorganize their bomber formations, and to concentrate on the creation of light units of fighters, close support aircraft, and reconnaissance planes. Before this decision was made, however, the United States had entered the war. When this occurred, the Soviets learned not only the Anglo-American air-armament program figures, but also the long-range objectives of the Western Allies. As a result of the superior industrial facilities of the Western Hemisphere, the Soviets were now able to abandon their plans for strategic warfare against Germany. This was logical, since the results obtained, considering aircraft ranges and the distances from the Russian bases to the German armament centers, would be only half of those which could be obtained by the Anglo-Americans based in the British Isles. Hence it would have been of no advantage to have burdened the Soviet armament industry with the production of bombers, a course which would only have hindered the reinforcement of the light aircraft formations.

The Soviet command therefore left the entire conduct of strategic air warfare against Germany to the Anglo-Americans, retaining only a small number of bomber formations which constituted a sort of test force and with which a few relatively unimportant operations were carried out. This plan directed the entire strength of the Russian air armament industry and training facilities toward development of large fighter and close support units. These decisions were extremely helpful to the Soviet Army, which was progressively freed of the restrictions resulting from German air superiority, and, after 1943, was able to carry out its attacks under the protection of the Soviet Air Force. At the same time, the Soviet Army profited increasingly from the attacks made by the Anglo-American bombers on the German rear areas, industries, and transportation.

These are the reasons why the Germans in 1945 found the Soviet Air Force so different from that of the Anglo-Americans in structure, organization, and command. The Russians, always masters of improvisation with simple, inexpensive means, had first passed their aviation crisis only with difficulty and the help of their allies, and then had given their Air Force the form which fitted best their needs and mentality.

It might be added that for similar reasons the Soviet Union did not undertake the construction of a great air transport fleet which the Anglo-Americans used even more decisively in the Pacific and Asi-

atic theaters than in Europe. The excellent railway network in European Russia, the ability of the Russians to shift for themselves, and their reckless exploitation of the human resources of their entire population, enabled them to carry out large-scale operations without the help of efficient, though costly, air transport.

On the other hand, we should not ignore the great increase in strength and effectiveness of the Russian air defense forces (antiaircraft artillery and signal corps) from 1941 to 1945. As in the case of the construction and command of their armored forces, the Russians were able to profit in this field from their tactical and technical experiences; and this was of decisive influence in the declining effectiveness of the German attacks.

German Observations

German conclusions on the organization, personnel, and matériel of the Soviet Air Force up to 1945 were as follows:

1. The ground organization of the Soviet Air Force in 1941 was not yet complete. Many air fields were in the early stages of construction, though as early as August 1939, there was a small number of modern air fields completed east of the Soviet boundary. These were constructed on a large-scale, possessed concrete runways, were skillfully camouflaged, and included underground tank installations and adequate shops and shelters. The latter were simple Russian barracks. Command shelters for war use, such as camouflaged block-houses or tent camps, were provided. It is to be noted that the Soviet Air Force suffered its combat losses of 1941 on the cramped, inadequate fields of the former Polish area and in the border states.

2. The German attack of 1941 occurred at a time of definite Russian armament weakness, while the Germans were superior in technical proficiency and combat experience. This superiority first began to decline in the winter of 1941-1942, when the Russians showed themselves superior in winter warfare, improvisation, and camouflage.

3. From the winter 1941-1942 on, the Russians gradually gained strength. They displayed great adaptability and facility of learning from their own and German mistakes. Their higher command became more articulate and energetic; the idea of the point of main effort became an established concept with them. On the other hand, they appeared to engage their forces in accordance with fairly rigid rules. The lower echelons of tactical command were often lacking in resourcefulness and the ability to act independently according to the situation. This probably can be attributed both to a general military formulism and the average level of mentality of troops and commanders. The necessity for curtailing the training period during the war, as well as other training difficulties, may likewise have favored a certain inclination toward formulism by the lower command.

4. The average Russian flier was intelligent, spirited, impassioned, and often politically fanatical. One also encountered politically indifferent individuals, as well as others who gave creditable assurance that they were opponents of Bolshevism. Natural mental abilities of some fliers seemed to be stunted as regards mental independence and willingness to assume responsibility, the consequence of an inflexible educational system stressing formulism. Distrust between officers and men was often noticeable, as was distrust between comrades.

The Russian flier was a determined assailant and stubborn pursuer, whose purpose was seldom changed even by violent defense fire. In the main, however, he was inferior to the German as a fighter. Their characteristic disregard of death was evidenced by frequent cases in which fliers who had made a forced landing or who had bailed out committed suicide

rather than submit to capture. Reports regarding the common mistreatment of prisoners caused them to prefer death to imprisonment.

It is just as hard today as before World War II to obtain a clear picture of the current status and capabilities of the Soviet Air Force. Impressions gained by the Germans during the war in the examination of Russian prisoners and in combat with Russian fliers allow deductions which perhaps approach the truth. Complete clarity cannot be gained in this way, of course, but such erroneous judgments as those by the German high command up to 1941 in estimating the strength of the Russians as negligible, can be avoided.

Soviet Air Force Today

How do matters stand today with the Soviets? This question is frequently asked. No one knows the answer. What may we assume?

When World War II ended, the Soviets possessed an Air Force which enabled them, in the area of Königsberg alone, to employ daily from 2,000 to 3,000 light aircraft, mainly close support planes with fighter protection. If we transpose these figures to the other main fronts, we are able to assume a daily employment of from 12,000 to 15,000 planes. If we assume an average of two or three sorties per day, then we may count on a daily quota of from 5,000 to 7,000 close support and fighter plane sorties per front. According to German experience, this would correspond, under favorable conditions, to approximately 50 per cent of the total strength, or a total strength of 10,000 to 14,000 planes in the front areas. We must also add to this the extremely powerful home fighter protection, and the aircraft engaged in the protection of the rear army areas, which can hardly be assumed to have been less than 2,000 planes.

Although the Allies have to a very large extent demobilized their air forces, no such reports have been heard from Soviet Russia. It can, therefore, be counted on that the Soviet Union still has at its disposal, west of the Urals, an air force of around 15,000 planes, at least 75 per cent of them light planes in fit condition for employment. There have been no combat losses to reduce the strength of the Russian forces. Even with strong curtailment of production, it would be easy for the Russians not only to maintain this strength but to build up considerable reserves.

The question as regards Russian bombers is an open one. There is no reason to assume that the Soviets are unique among the nations in not having recognized the decisive military importance of a strong fleet of bombers. If, therefore, they have recognized this truth, then we may assume even less that they today are knowingly neglecting the construction of such a fleet, as they were forced to do during the war. Ever since 1945, the Soviets have had the opportunity to systematically develop heavy air units. It would be technically possible for them to possess the most modern and powerful fleet of bombers on earth today, plus special industries organized for further development and production.

We may also assume that the Russians, who have at their disposal many German experts, if they care to use them, have further developed the technique of remotely and automatically controlled missiles; that they are no longer behind other nations in high frequency techniques; and, lastly, that they are no longer beginners in the matter of atomic weapons. Any underestimation of the technical and industrial ability of Soviet Russia might be costly.

Operation "Dagger"

Digested by the MILITARY REVIEW from an article in "The Fighting Forces" (Great Britain) October 1948.

IT was a good idea to start the Air Defense Exercise on 3 September, the anniversary of the opening day of World War II. It will have brought home to the world at large the vast difference in Britain's state of air preparedness now and on 3 September 1939. It will have brought home, too, the fact that, if in 1940, with only 59 fighter squadrons in Fighter Command, we were still able to win the Battle of Britain, now with not only increased numbers but with vastly improved aircraft, both in speed and equipment, we can face the future with confidence. In fact, an air of supreme confidence was the outstanding characteristic of the crews of the Meteor IV jet-propelled fighters, who were ready on 3 September to meet the attacks of the Southland bombers.

The air exercise (the biggest since the war) embraced all home-based operational commands of the RAF, including the 16 fighter squadrons of the Royal Auxiliary Air Force. Also participating were the American Super-Fortresses stationed in the United Kingdom, aircraft from the British Air Forces of Occupation in Germany, AA Defenses, the Royal Observer Corps, and Civil Defense units.

The general idea of the exercise imagined an enemy continental power, called Southland, with a western coastline joining Basle, in Switzerland, to the Dutch island of Juist, and thence northwards to a point about half-way up the Norwegian coast.

Southland issued an ultimatum to Northland (an area which included the Midlands, East Anglia, and Southeast England) which expired at noon on 3 September. The ultimatum was rejected and a declaration of war followed.

Northland's air defense forces comprised all first-line squadrons of Fighter Command (except the Hornet aircraft operating for Southland), Fighter Command control and reporting system, operational flights of the Royal Auxiliary fighter squadrons, AA units, and Civil Defense forces.

Southland's forces included Bomber Command units, Coastal Command units, American bomber units, aircraft from the British Air Forces of Occupation in Germany, Yorks and Dakotas from Transport Command, and Hornet aircraft from Fighter Command.

In order to make the exercise as realistic as possible, Southland's night bomber forces dropped "window" during some of their attacks on this country. "Window" is an anti-radar device consisting of lengths of metallic tape and metalized paper which mislead the radar stations as to the strength and direction of an attack.

The 3d of September was a wet day. Sixty-five minutes after Southland's ultimatum had expired, Northland's defensive warning system located heavy bombers flying high over the Dutch coast. Within 15 minutes Meteors intercepted them at 33,000 feet. Small raids of generally not more than 12 aircraft continued throughout the day. Places where "damage" was done were London, Portsmouth, Birmingham, Hull, Coventry, Rugby, and Cambridge. But, generally speaking, the "damage" was not excessive and the defenses acquitted themselves in an entirely satisfactory manner.

Night attacks on a larger scale followed against London and other centers. As in the war, the day raids were carried out by American aircraft and the night raids by RAF, Lincoln and Lancaster bombers. Cooperation between the guns and fighters

of the defense proved highly satisfactory.

On the second day, as on the first, most of the raids were on a small scale, though they involved intense activity on the part of the defense, who, we understand, were testing a new method for an early warning system of radar, also new methods of engaging targets, both of which are believed to have given good results.

On the third day there was a really spectacular event. In the early hours of the morning Northland's radar eyes detected a force of Lincoln bombers approaching the Newcastle area from the northeast, while another force of bombers was reported from the east apparently heading for London (which latter was in fact a "spoof" force of Lancasters).

We now give the umpire's official communique:

"Careful timing and tactical planning by Bomber Command had been used to draw off the fighters from the main force. The 'spoof' force, by the skillful use of radio technique, appeared to the radar observers to be a large formation, but, in fact, consisted merely of a handful of bombers. Meanwhile, the main force continued on their southerly track and eventually bombed London, with but scant attention on the part of the defending fighters."

Obviously, this was a clever and well-thought-out ruse, for which the chief credit must go to Air Marshal A. B. Ellwood, Commanding in Chief, Bomber Command. The radio technique referred to was really a skillful use of "window." As the spoof force neared the coast, Northland's radar plot began to disappear, owing to the use of the window metal strips. Thus, the impression was given that a large force was approaching and the fighters were drawn from the real attack coming from the north. After this brilliant piece of work, Southland evidently considered she had finished off most of London's defenses, and devoted her attention to key industries. Minelaying operations were also carried out in the Portsmouth and Southampton areas.

The exercise ended in the early hours of 6 September, after a series of night attacks by Lincoln and Lancaster heavy bombers on targets in London and along the Yorkshire coast. Fighter Command, Bomber Command, and AA Command all issued bulletins at the conclusion of operations. We may deduce from these bulletins the rather disquieting fact that quite a considerable number of the attacks reached their objectives.

Comments

The most striking, the most comforting, fact that emerges from this latest air exercise was the presence of 90 United States Super-Fortresses. For the first time in history a friendly power has taken part in another nation's peace exercise, and we hope the practice will be continued, for nothing is more likely to preserve peace in the world.

The potential enemy represented by Southland had a western frontier that extended from Basle, in Switzerland, to the Dutch island of Juist, and thence to a point half-way up the Norwegian coast. If ever in a future war the enemy should get so far west the situation would be black indeed, for the exercise has shown that an enemy based on territories comparatively near to the British Isles could inflict immense damage and loss of life. Admittedly Operation *Dagger* was officially described as a training exercise rather than as an exercise based on some possible future war, but we can't help feeling that the exercise would have been more valuable, and a greater deterrent to a future war, if it had had as its *raison d'être* the *prevention* of a potential enemy reaching such an unpleasant proximity to the United Kingdom. We hope, therefore, that next year's air exercise will take place over Western Germany, preferably in conjunction with land forces.

The development of jet fighters is proceeding apace, and the majority of our fighters are now Meteor and Vampire jet fighters with speeds of between 500 and 600 mph, and Hornets with a speed of 475 mph. Jet bombers are not at present available in this country, though the United States has at least four types of jet bombers under test, and all these types of bombers used in the recent exercises were piston-engined with a cruising speed of 175 to 250 mph. Even so, they managed to get through on numerous occasions, so that if a potential enemy were armed with jet bombers this country would be in for a very bad time.

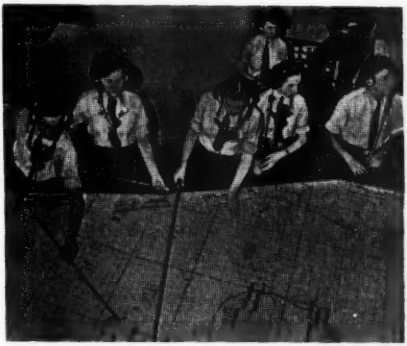
The problem of guided missiles and rockets still remains an appalling menace, and as far as we know, Operation *Dagger* did nothing to solve this problem. The air problem is, in fact, appallingly complex, so much so that it may, by its very complexity, help in the prevention of another war. AA Command, in the recent exercise, showed itself to be efficient and enthusiastic, but as far as the Territorials were concerned there was a lamentable lack of personnel.

Fighter Command Summary

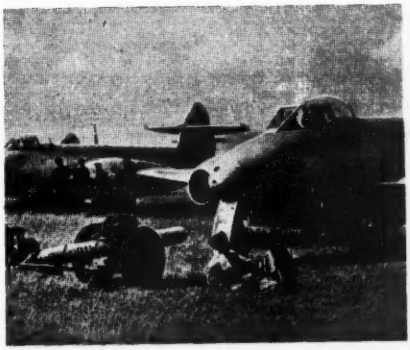
The Air Officer Commanding in Chief, Fighter Command, Air Marshal Sir William Elliott, speaking at the conclusion of Operation *Dagger*, said: "The success and therefore the value of the exercise was due both to the high standard of flying of the aircrews and to the fine spirit shown by the ground crews." The Fighter Command summary follows:

Bomber Command attacked in every way to make the defense of Northland difficult. Attacks have been made at varying heights and at varying strengths from one aircraft to major forces. These attacks have been spread over Northland and have exercised the defenses thoroughly. In every phase the exercise and destruction rate have been satisfactory despite the adverse weather conditions.

Operation "Dagger" was Britain's biggest air exercise since the war. Above, a USAF B-29 which cooperated in the test.



Above, operations room, RAF Fighter Command; below, Meteor jet fighters on the alert.—The Illustrated London News photos.



By day and by night the weather has been bad. The weather has provided ideal conditions for the test of a force capable of flying in all conditions.

It was necessary for the exercise to throw into gear the whole control and reporting machinery which had not been used as a whole since the end of the war. The restoration and maintenance of the landlines involved have given the General Post Office a large part in the exercise. Very few controllers had had any actual experience of war conditions and many of the WAAF and airmen plotters were new to the job and unused to the long and tedious hours of work involved. During the week end, the system has been fortified by thousands of the Auxiliary personnel of the Air Defense units and the volunteer members of the Royal Observer Corps. In the case of the Royal Observer Corps, much of their spell of duty was necessarily spent out in the open in unpleasant weather conditions. For some of the recruits of the Auxiliary Services who did not see service during the war, this exercise was their first tour of night operations.

Civil aircraft have been plotted in addition to the aircraft taking part, but there has been no interference with civil flying. Those taking part in the exercise have risen magnificently to the demands made upon them, and have contributed in large measure to its success.

Despite difficult weather conditions, a large number of interceptions have been made by day and by night by Regular and Auxiliary squadrons. No figures of aircraft judged to be destroyed will be available until the records are analyzed, but the number of interceptions made is satisfactory. The number of interceptions at sea was also considered satisfactory.

The Auxiliary squadrons, operating under war conditions for the first time since the war and in some cases with no Regular assistance, have achieved results comparable with the Regular squadrons.

Among the many features of the exercise is the excellent way in which the Royal Auxiliary Air Force and the Air Defense units have worked together with the Regular Air Force. The work of the WAAF in the plotting rooms and on stations has shown that they are able and willing to work under stress as were the WAAF in wartime.

Parallel with RAF Fighter Command, Antiaircraft Command has taken its place in the defense scheme, both Territorial and Regular antiaircraft units have benefited greatly from the exercise and have gained as much valuable experience as the Royal Air Force.

Bomber Command Summary

The Air Officer Commanding in Chief, RAF Bomber Command, Air Marshal A. B. Ellwood said: "Throughout the exercise the attacking forces of Southland navigated their way to their targets through bad weather conditions, which included heavy cloud, stretching on occasions upwards from very low level to 30,000 feet, and delivered their attacks both by day and by night."

The enemy reacted violently to these attacks; nevertheless, heavy bombers forced their way in waves of 50 or more to bomb Clapham Junction, Vauxhall Bridge, and electrical installations in the Chelsea area. The War Department in Whitehall was considered obliterated during one raid.

Forces of heavy United States Air Force bombers attacked industrial centers in Coventry, Nottingham, Leicester, Swindon, Reading, and London.

Southland photographic reconnaissance aircraft ranged far and wide over enemy territory during the exercise and secured valuable information on the location of newly built "war factories."

Low-level attacks were also made on enemy air fields in the southern part of

England and on two occasions a row of fighters were caught refueling on the ground. They were attacked and when Southland's aircraft left the fighters were assumed to be burning furiously and the crews dashing for safety amidst exploding petrol, and at least 30 of the enemy's latest and most vaunted fighters were claimed to have been destroyed.

Antiaircraft Command

An AA Command spokesman said that one important lesson of the air exercise was that the operational problems involved by high-flying massed raids had been successfully met by the integration of guns and fighters. Communications, generally, and the vital liaison between AA Command and Fighter Command had been thoroughly tested.

"Our ack-ack defense organization has greatly benefited from the experience of engaging high-flying, fast-moving massed targets," he declared, "and units also got valuable instruction from the massed daylight raids by B-29s, for since the early days of the last war they have had little opportunity of practice against such targets. Other lessons of the exercise are being carefully 'digested'."

Antiaircraft equipment in use was described as being very satisfactory. Another feature of the exercise was the enthusiasm shown by Territorial Army units assisting the Regular Army.

Espionage and the Swedish Security Service

Translated and digested by the MILITARY REVIEW from an article in "Ny Militar Tidskrift" (Sweden) No. 8-9, 1948.

THE secret intelligence services of the great powers are certainly more active now than they formerly were in peacetime. As a result of their geographical position, the Nordic states are quite naturally affected by this activity. It has been unavoidable that Sweden should be a focal point for the activities of the great power intelligence services. Some of our large cities thus have become centers of such activities.

The foreign intelligence services have as their objective not only information concerning conditions in the other great powers which are their potential enemies, but, since Sweden also could be drawn into a conflict between the great powers, these activities are also directed against Sweden. In planning an eventual attack on Sweden, according to the accepted custom in this field, measures for sabotage and fifth-column activities are probably also being considered along with purely intelligence activity.

Illegal activity of this kind does not aim only at determining purely military conditions; it considers destructive action against installations which form a part of the defense system. Experiences of World War II show that espionage, sabotage, etc., are directed against all departments of the nation's social life, and even aim at undermining the will of the civil population to resist.

The forces operating in this field are extremely varied. Both during and after the recent war, the personnel of foreign embassy services violated certain diplomatic rules, and through the intervention of the department of the exterior were forced to leave the country. Another group is made up of secret agents who are sent out directly by the intelligence organizations of the respective countries. Activity of this nature is further facilitated by the fact that a considerable number of aliens reside in our country and are employed in practically all the different

activities of our national life. Many of the foreigners are refugees who came here during or after the war and of whose past we have little or no knowledge. We must count on the fact that certain of these persons may be agents who have been sent out by the intelligence services of foreign powers. Although the majority of the aliens in Sweden are doubtless worthy persons, it should be noted that among them are to be found various anti-social and criminal elements. The fact should also be noted that a foreigner who seeks refuge in our country, even though he desires to conduct himself in a loyal manner, can be led by blackmail or other means to commit criminal deeds against the country where he is a guest.

Collaboration in illegal activities by Swedish citizens can be expected from persons who feel that they have a connection with a certain foreign power on ideological grounds. But other motives, above all, economic ones, can turn Swedish citizens into traitors. This is illustrated by our experiences during the war. In this connection it must be noted that crime among youth has steadily increased in recent years; the number of crimes now committed is double that of the late 1930s. With this increased demoralization, greater possibilities must exist for foreign agents to win helpers.

Under these conditions, greater attention must be given our own security service. With respect to the military security service, certain measures have been taken to give effectiveness to its action. Furthermore, forces which have been placed at the disposal of the police authorities have increased their capacity for discovery and prevention of espionage.

During the last war, criticism was sometimes directed against the effectiveness of the general security service. This led to the appointment of a parliamentary committee for the investigation of such activities. In its report in September 1947, the commission found that in certain cases justifiable criticism could be raised against the action of those in office. But in general, the committee reported that the security service had carried on its search activities in accordance with pertinent legislation and directives, and that from the technical standpoint its work was well organized. It must also be borne in mind that the general security service during the war was largely improvised, and that the majority of those so employed lacked experience in this work.

Finally, the security service can be effective only when there is collaboration on the part of all competent agencies, private enterprises, and private individuals, when the task at hand is to prevent the illegal acquisition of knowledge regarding secret matters or damage to important installations. Every competent agency and every enterprise should adopt proper measures for protection, and every official should maintain a watch over his service activities, with all the thoroughness required by concern for the security of the nation. At the same time, every citizen should be on the lookout for incidents which might indicate illegal activity and not delay in bringing such matters as quickly as possible to the attention of the proper police or military authorities. Vigilance must prevail in the Swedish nation.

We intend to rule no land but our own United States, but we are determined to do that.

Fleet Admiral William D. Leahy

Japanese and American Strategy in the Pacific

Digested by the MILITARY REVIEW from an article by Lieutenant Colonel Alfred H. Burne in the "Journal of the Royal United Service Institution" (Great Britain) August 1948.

THE strategy of the late war in the Pacific is a fascinating study, and surprisingly little has been written on the subject in England.

When we view the operations as a whole, they seem to constitute a coherent entity: The American strategy was a complement of the Japanese—the one was the inverse of the other. The Japanese operated on interior lines, the Allies on exterior.

Japanese Strategy

It is impossible to withhold a tribute of admiration for the Japanese planning. Apart from the purely air attack on Pearl Harbor, there were no less than six separate and simultaneous task forces on the sea and en route for their destinations when that felon blow was struck. These destinations were Midway Island, Guam, Gilbert Islands, Luzon, Malaya, and Hong Kong. It is reasonable to suppose that the first three were based on Truk Island and the last three on Formosa. All six achieved their object.

In subsequent operations, Japan seems to have worked by a succession of "waves." This is not surprising, for the great majority of her troop-carrying ships must have been employed in the opening operation and would have to return to port to be reloaded; thus a fortnight at least might be expected to intervene between each wave. That is approximately what happened. A series of four of these waves can be seen between 9 December and the end of February. The first wave has been already mentioned. The objectives of the second were Borneo, Wake Island, and the Celebes; the third, Amboyna, New Guinea, Rabaul, and the Solomons; the fourth, Sumatra, Bali, Timor, and Java.

Thus, by the end of February 1942, she had formed a vast semi-circle of conquests, and had almost achieved her object. In order to safeguard her flanks she required the Andaman Islands on her right flank, and the Aleutians on her left. Both these were acquired by two expeditions in March and June respectively. Even so, she was not satisfied. Leaving out of account her continental aspirations in China, Burma, and possibly India, she still needed to secure herself from all fear of combined attack from the United States and the British Empire by driving a wedge between the two. This meant the acquisition of the New Hebrides and Eastern Australia which, I think, explains the determined and repeated attempts to enlarge her conquests in the Solomons and beyond during the ensuing months—attempts which brought about some of the bitterest and, at the same time, the most interesting fighting of the whole campaign. It also marks the turning point of the war in the Pacific.

Let us stop for a moment to review Japan's strategy in the opening moves. It is clear that, from the outset, whether she liked it or not, Japan found her strategy conditioned by geographical considerations; she lay between three enemies—Britain to the southwest, Holland to the south, and the United States to the east. In other words, she was bound to operate on interior lines. Theoretically, it is difficult for a country acting on interior lines to force a decision, the chief reason being that the farther you push your enemy back the more difficult it is to surround and destroy him. How can we account for the fact that at first Japan succeeded almost everywhere? As I have described it elsewhere, you require a walled or roped-in space like a boxing ring in such a case to prevent your enemy jumping out of the ring and saving his skin. In the places

where Japan gained her greatest successes, there was just such a "rope." It was provided by the sea. As the result of Pearl Harbor, and the sinking of the *Prince of Wales* and *Repulse*, she had secured the local command of the sea and could chew up her opponents on the various islands at her leisure. Nevertheless, there were three quarters or theaters where she failed to obtain this decision; they were China, Burma, and New Guinea. The reason is obvious: Two of them are not islands and the third is so large that it may almost be rated a continent. Thus, results were in accord with theory.

There is, however, a paradoxical feature about operating from an interior position, namely, that the farther you progress the weaker and more perilous does your strategical situation become, for you are continually increasing the length of your perimeter. Unless you can be sure of making peace before your enemy can counterattack, your frontier will absorb more and more of your armed forces to garrison and defend it; the thinner will become your line of defense, and consequently, the easier will it be for your adversary to penetrate it when he turns to attack.

But the course of these operations brings out another very profound principle of war—the virtues inherent in the offensive. Textbooks are sometimes slightly ridiculous when they discuss at length whether one should adopt the offensive or defensive, for more often than not there is no option. The defensive may be forced upon one—as it was on the Allies in this case. Nevertheless, there are occasionally cases where a country has the option of taking the offensive and lives to regret that it did not do so. Such a case was that of France in 1939. In the case of Japan, the advantages inherent in the offensive are very evident. Generally speaking, the greater the extent of common frontier, or accessible frontier—such as the sea provides—the greater are the inherent advantages of the offensive. A more striking example of this could not be imagined than that offered by Japan. By striking before the declaration of war she secured the initial command of the sea and some thousands of miles of frontier. The Allies were spread perilously thin everywhere. As Frederick the Great and Napoleon had pointed out, "He who tries to defend everywhere is weak everywhere." The Allies tried to defend everywhere. Indeed, they had no option, the blow falling before they could alter their dispositions even had they wished, with the inevitable result that they were weak everywhere and thus fell an easy prey to hostile attacks.

American Strategy

The turn of the tide is usually imperceptible. Only the keenest eye will detect the exact moment of the turn. In point of fact, the turn of the tide in the Pacific war can be pin-pointed with some precision. Bear in mind the ultimate objective of the Japanese in the Pacific—to drive a wedge between Great Britain and the United States. In order to achieve it they made three attempts; one by sea, which was defeated in the Battle of the Coral Sea, and two across the peninsula of New Guinea. The second of these was aimed at Port Moresby, and it got within twenty miles of that place on 15 September 1942. It there came to a halt. A significant pause of a fortnight ensued and then the tide receded, the Australians pushing their opponents gradually back across the Owen Stanley Mountains to Buna. At Guadalcanal the Americans were attacking. On land, the Japs had shot their bolt. On sea, they still had a few shots, but the naval engagements of November off Guadalcanal sent their ships scurrying for the shelter of their ports, whence they did not emerge in strength till the battle of the Philippines almost two years later.

The interest of this period, including the battle of Midway Island, is tactical rather than strategical, so I must regret-

fully pass it by and go on to consider the Allies' plan for the strategic counter-offensive.

For months the battle surged on New Guinea and in the Solomons. The northern coast of New Guinea is well over 1,000 miles long—roughly the same distance as from Alamein to Tunis. It had taken Montgomery more than five months to get there. MacArthur, when he began his great advance along the coast of New Guinea in April 1944, covered the 400 miles to Hollandia in a few days. The explanation is simple—he had obtained complete local command of the sea, by which medium he sent his troops. Great pockets of Japanese were left hundreds of miles in the rear, where they remained (if they did not die) till the end of the war (another example of the wastefulness of troops in the defense). The "hop" of 400 miles had prevented the support of army fighters, so air support was provided by naval carriers. At infinitesimal loss, 50,000 Japs had been cut off and potentially removed from the war by fine cooperation of all arms. There were to be many more examples of this, but the capture of Hollandia will serve as a pattern of what was to become an almost stereotyped process.

The first stage was the bombing of the objective by carrier-borne aircraft. Air cover by fighters was then provided by the naval task force as, followed by the landing force, it approached the island. Then came tactical bombing and naval bombardment, under cover of which the landing would be made. Finally, after consolidation, air fields and a naval base were established. The same process would lead to the mopping up of the next island selected for attack, and so on. Originally, the necessity for establishing naval bases tended to restrict the rate of progress. The development of refueling at sea, and the provision of a fleet train capable of replenishing and repairing ships without their having to return to a base, greatly improved the mobility of the whole armada.

When MacArthur announced that he did not intend to advance methodically from island to island, but that he would "leapfrog," it was a clever piece of "double-bluff." The Japs could not believe he was speaking the truth and were surprised to find that this really was his plan. He was in the happy position that, with command of both sea and air, he had an almost unlimited choice of objectives. For the Japanese, it became an immense guessing game, and by the laws of probability the odds were heavy against their guessing right. In fact, they hardly ever did guess right. The most serious case of their guessing wrong was the invasion of the Philippines. They confidently informed the garrison that there would be a pincer attack from the north and south. Instead, MacArthur (acting on Admiral Halsey's recommendation) selected the center for his attack, thereby achieving complete surprise.

The Americans were now getting uncomfortably near Japan itself and the invasion of the Philippines could not pass unchallenged. The Japanese fleet was, therefore, called out of its hiding and rushed forward in a desperate attempt to interfere with the landing. The result was the most interesting naval operation of the whole war, but we cannot deal with it here.

The closing stages of the war need not detain us for long. Events followed what had by now become an almost stereotyped pattern and with almost monotonous regularity and precision, as step by step, the United States forces approached Japan. This very sameness is a tribute to the planning of the staff and to its execution by the troops. The only thing that varied was the casualty list. This tended to increase the nearer the Allies approached Japan, as resistance became even more bitter.

From then to the end of the war, there are few new features to record except the advent of the atomic bomb.

Battle of the Western Alps, June 1940

Translated and digested by the MILITARY REVIEW from an article by General Francesco Roluti in "Rivista Aeronautica" (Italy) May 1948.

TODAY, the Battle of the Western Alps can be seen in its true light: great difficulties from the standpoint of terrain—extremely difficult by nature and rendered still more so by many modern fortifications; adverse weather conditions; action that lasted a bare four days for one army, three for the other operational army, and two for some parts of the army; air action rendered almost nil by storms and dense fog; German armored divisions stopped before the difficult and well defended Alpine passes; and, in spite of all this, the fall of the French fortified outpost zone, as a result of the attack of Italian forces.

Obstacles to an Attack

Rough, mountainous terrain with summits more than 3,000 meters high and with only a few difficult avenues of approach, characterizes this French-Italian boundary, the eastern slope of which descends to the Piedmont plain and has a depth of barely 40 kilometers, while the opposite slope is three times that depth. The five obstacles of major interest from an operational standpoint, are as follows: 1. Isère—Piccolo S. Bernardo—Dora Baltea; 2. Arc—Moncenisio—Dora Riparia; 3. Durance—Dora Riparia; 4. Ubaye—Stura; 5. Roia Tenda—Cuneo.

From the operational standpoint, the fact should be noted that an advance from the valley of the Aosta by way of the Piccolo S. Bernardo, descending the valley of the Isère in the direction of Albertsville and Grenoble, would cause the fall of all French defenses in the Alps area. The obstacle, Dora Riparia—Moncenisio—Arc, runs parallel to this direction of advance.

The obstacle Stura—Ubaye guards the route of an advance along the coast toward Marseilles and Nice.

The most profitable effort would be in the direction of Piccolo S. Bernardo, but it is longer and more difficult. It would be facilitated by an attack from the direction of the Lyons—Valence front, directed against the rear of the French defenses facing the Piccolo S. Bernardo. Such a situation was possible, but failed to develop during the battle in question.

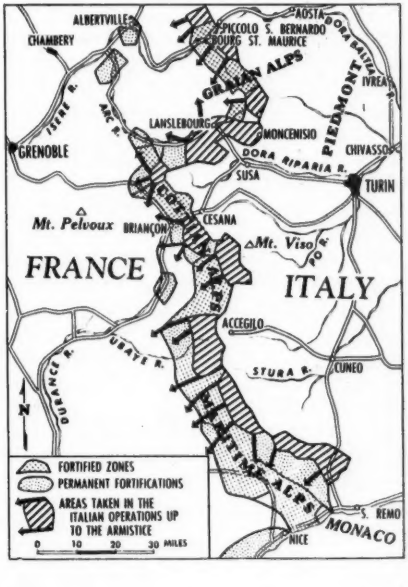
All the various lines of penetration, including minor ones by way of secondary passes, were strongly barred by the French with modern fortifications, well armed and manned. Complex positions equipped with artillery and automatic weapons, excavated in the rock with underground approaches and communications, constituted a powerful zone of resistance. Intermediate positions for automatic weapons and antitank guns were placed in front of the main defenses. Still further advanced, a few hundred meters from the international frontier, there were small positions, isolated casemates and concrete emplacements of various types for automatic weapons or antitank guns, often camouflaged as small villas surrounded by vegetation. Altogether, the fortified system measured from 20 to 50 kilometers in depth and presented a deep fire wall opposing every direction of penetration. France, already favored by naturally strong defense positions, had modernized and enlarged the permanent defenses.

Situation Preceding the Operation

After the East African and Spanish campaigns, Italy needed much time in which to prepare for a European conflict. The head of the government had estimated that Italy would not be able to enter a

conflict before 1943. Badoglio, chief of the general staff at the time, believed that Italy would not be ready even by 1943, but events and individuals changed the estimates. When, in September 1939, Hitler began the Polish campaign, he wrote to the Italian chief of state that the dispute concerned Northern Europe only, and that Germany felt capable of handling the matter alone. Italy, therefore, would be able to remain quietly apart; Germany was satisfied with the good will of the Roman government. The Italian chief of state, perhaps suspicious of the existence of pacts regarding "living space" between Germany and Russia, gave orders for the reinforcement of the Italian frontier in the direction of Germany, and saw to it that the western frontier was properly guarded, declaring Italian non-belligerency. After the Polish campaign, there was a break in the military operations, suddenly ended on 9 April 1940 by the German invasion of Norway. On 10 May, the powerful German military machine turned against Western Europe, quickly crushing all resistance. Holland and Belgium laid down their arms. The English army in Belgium was forced to re-embark. The entire northern portion of the French army was overthrown. Badoglio states that at that time the chief of the Italian government regarded the fall of England as imminent, and was overcome with a mad desire not to be excluded from the victor's feast. Perhaps it was the specter of Hitler and Stalin dominating Europe that appeared threatening to him, and, in the light of what we now know, this was no idle fear. The decisions of Rome were made rapidly. On 26 May, the chief of the government communicated to Badoglio that he had written to Hitler, informing him that he would be ready to declare war by 5 June. On the 10th, Italy officially declared war against France and England.

In the meantime, the Italian army remained in defensive positions in the Western Alps with its large units and artillery drawn well back. At least twenty-five days would normally have been required to make an offensive deployment. It is not known on the basis of any official documents why steps were not taken immediately after 26 May to redeploy the forces for an offensive operation. The French general staff had originally intended to invade the Paduan valley, while holding the German army before the Maginot line, but



by 26 May such a plan was impossible in view of the heavy losses that had been suffered in Belgium, and the turning of the Maginot line on the north.

Events in France continued at a rapid pace. On 9 June, the von Block group of armies reached the Seine a few kilometers from Paris, and on the same day the von Rundstedt group of armies attacked toward the Marne. The French Army, under the impact of tanks and Ger-

man *Stukas*, was literally pounded to pieces. On 17 June, Marshal Petain, new head of the French government, sought an armistice.

The Italian army, on the western frontier, remained on the defensive until 16 June, when orders were given to prepare for offensive operations. On the afternoon of the 20th, the order was given to all forces along the entire front, from the Piccolo San Bernardo zone to the sea, to attack at 0300 hours the following morning with the aim of penetrating into the French territory as far as possible. The armistice, which had already been asked for by the French, and the occupation of nearly two-thirds of France by the Germans, did not allow time for a deep penetration in the Alps in the direction which would undermine the entire system of defenses. The effort was made, however, to penetrate everywhere as far as possible, with a view to improving, from a defensive point of view, the Italian political boundary.

Attention has already been called to the amount of time that would likely be necessary for changing from a defensive to an offensive status, at least twenty-five days. Actually, only four days were allowed for this. The natural difficulties of a high mountain zone, rough, broken, and lacking in communication routes, were increased by stormy weather and heavy snowfall.

These difficulties forced the Italian forces to attack only on the right (the Piccolo San Bernardo zone) initially.

The forces which were facing one another over the entire front were as follows:

The French had 200,000 men, well established in modern fortifications, unaware, for the most part, of the disastrous events which had befallen the French forces in the north and in the center.

The Italian forces included 300,000 men in the western army group of two armies: The First Army, from the sea to Monte Granero (not included); the Fourth Army, from Monte Granero to Monte Rosa (not included). There were 100 Italian bomber planes and 200 fighters, but they were operating under directives of the army chief of staff. Each army had reconnaissance aircraft at its disposal, the reconnaissance to extend as far as the Marseilles front, the Durance river, Grenoble, the middle Isère, and Lake Bourget. The army chief of staff was to provide longer range reconnaissance, and information required by the army could be requested from him.

The Operation

On 21 June, only the mountain corps of the Fourth Army attacked in the Piccolo San Bernardo zone. Its objective was to open a way into the Isère Valley. Destruction of the fortified works of Bourg St. Maurice was assigned to the bombing aviation, from dawn to 0630, but no longer. The artillery preparation began at 0830. At 0900, the advance of the mountain forces was to begin.

In the meantime, German armored forces had reached Lyons, and were preparing to attack in the direction of Chambery and Grenoble, in the rear of the defenses of the valleys of the Isère, Arly, and Arc. This operation was scheduled for the 21st or the 22d. In the early hours of the morning, Italian bombers, in spite of the fog, carried out the prescribed bombing action. The reconnaissance planes scoured the upper valley of the Isère and the Valley des Glaciers. At 1000, a half hour late, owing to difficult movement because of the deep snow, the mountain forces attacked from the heights of la Seigne, Piccolo San Bernardo, du Mont, and the traversable mountains between them. In spite of lively French resistance, they overthrew the defenses, advancing over the entire attack front. The French, however, detonated a mine field, cutting the Piccolo San Bernardo—St. Maurice road. Engi-

neer units of the Trieste Motorized Division quickly intervened and repaired the road. By evening of 21 June, the mountain forces, in spite of the deep snow and adverse weather conditions, had succeeded in advancing between two and four kilometers and in outflanking the Traversette fort, which was laying its fire down in the direction of the Piccolo San Bernardo.

The other large units of the Fourth Army had thrust formations into the valley of the Arc (Moncenisio sector), and in the Monginevro sector had penetrated one kilometer in the face of heavy fire from Briançon fortifications. The intervention of the air forces was requested in this zone, whereupon these forces heavily bombed Forts Janus, Goudran, and Chenaillet. Adverse weather conditions, however, interfered with efficient air action.

On 22 June, the First Army also began an attack from Monte Granero to the sea, with the intention either of forcing its way into the valley of the Ubaye and continuing afterwards through the valley of the Durance in the direction of Marseilles, or into the Nice area and then continuing in the direction of Marseilles. Maximum cooperation was requested of the 1st Air Squadron, but the activity of the bombers was greatly limited by continued bad weather. It was possible to bomb effectively only the fortifications west of Briançon, facing Monginevro, and the fortifications of Monte Agel, north of Monaco, facing Ventimiglia and Mentone. The army chief of staff, consequently, warned the surface units that they could not substitute aviation for artillery in the high mountains.

On 22 June, the Fourth Army continued the attack started the day before. The forces were forced to open a passage through the snow, which in some zones was three meters deep. In the Piccolo San Bernardo sector, it was necessary to repair the road leading to Bourg St. Maurice in order to continue on through the valley of the Isère toward the German armored forces already mentioned. It was, likewise, necessary to silence the Traversette fort with artillery fire. The fort was already outflanked, but was laying its fire down on the approach route to Bourg St. Maurice. A little after 1200 on 22 June, an auxiliary passage was completed alongside the first cut, which permitted the passage of motorized forces. About the same time, Fort Traversette appeared to be reduced to silence, as it no longer replied to the fire of Italian artillery. A second break was discovered in the road beyond the first break which had been repaired. The night of 22-23 June, it was announced that the German Sixteenth Armored Army would begin the offensive thrust against Grenoble and Chambery, in the rear of the French forces by daybreak on the 24th. The commander of the Fourth Army, facing that area, hastened the Italian advance toward the Isère Valley. He ordered an armored battalion of the Littorio Armored Division to push in the direction of Bourg St. Maurice, coordinating this movement with the advance of the mountain units over the slopes leading to the Isère and adjacent valleys. The leading armored company, after the first break in the road had been passed and two successive wire entanglements overcome, ran onto a mine field. One tank was knocked out and four others damaged sufficiently to halt their progress. The battalion commander believed that this was the result of well-aimed antitank artillery fire, and ordered the subordinate unit to fall back until Italian artillery could intervene. This error permitted the most favorable moment for the execution of their maneuver to pass. Italian units, advancing over the heights, were, on the evening of 24 June, in contact with the permanent defensives of Séloge, had advanced to beyond Seez, and from the Col du Mont had reached the Isère.

In the Moncenisio sector, from 22 to

24 June, Italian forces took the advanced French fortifications and centers of resistance. Lanslebourg, Termignon, and the route on the Arc valley floor, had been reached as well as the eastern edge of the Briançon basin in the Monginevro sector.

On the 22d, the First Army continued the attack with two groups of forces concentrated on its wings. The right group proceeded in the direction of the Ubaye valley, and the left, in the direction of Monaco and Nice. In the center, a smaller group acted as the connecting link.

On the morning of 23 June, all available bombing aviation attacked the French works on Monte Agel, in support of the left group of forces. At about 1100, the air bombing had to be stopped, however, on account of bad weather.

On the evening of 24 June, the situation of the First Army was as follows: Mentone completely occupied; in the Ubaye valley, and over the remainder of the front, French advanced positions were either taken or surrounded.

Generally speaking, by the evening of 24 June, Italian forces had seized possession of the French advanced zone everywhere over the entire Alpine front of 200 kilometers, to a depth of from eight to 32 kilometers, and were in contact with the French main defense zone.

The German armored units already referred to had not succeeded in reaching their objectives, as French units effectively barred the main roads up the valleys by which the German units attempted to ascend.

At the request of France, an armistice was agreed to on 24 June, and was signed at 1915 the same day. Cessation of hostilities was effected in France proper, and in her overseas possessions, at 0135 the following day.

Summary

It must be borne in mind that the offensive action was of brief duration, only four days for the Fourth Army, three days for the First Army, and twelve days for the left wing of the Second Army Corps, which was a part of the First Army.

The difficulties of the mountainous zone were accentuated, both by the unfavorable weather conditions and by the effective fire from the French fortifications.

While the French had fallen in Belgium and northern France as a result of *Stuka* and tank attacks, in the Alpine zone there was no collapse because of lack of action on the part of the armored and air arms. The same German armored units which had crushed everything before them were halted before the Alpine passes between Lyons and the Isère. They did not have the assistance of the *Stukas*, nor motor-transported troops to an extent sufficient to conquer the Alpine passes by ground attacks.

We must face the fact that we will never again, in this atomic age, have time to build our military strength during a period in which we are under actual attack.

Lieutenant General Raymond S. McLain

Military Theories in the United States

Digested by the MILITARY REVIEW from an article by Cyril Falls in "The Illustrated London News" (Great Britain) 5 June 1948.

AMERICAN publicists and journalists are frequently better informed than our own on subjects of high policy. It is the practice of the administration to take them into its confidence to an extent which is unusual over here. Certain of them are well known to be particularly favored and to be made use of for the purpose of putting over aspects of policy, so that they may be thoroughly discussed and become familiar. Others have the advantage of private channels which have few equivalents in Britain. In consequence, pronouncements on foreign affairs by the best American writers and broadcasters are illuminating and, in a large proportion of cases, correct in their estimates or prophecies. This would apply also to military affairs but for the fact that the number who have studied them, and are at ease in dealing with them, is very small. Here at least we on this side of the Atlantic have an advantage. We have more writers than the United States who understand at least strategy, even if the dearth of paper makes it difficult for them to spread their ideas. With us there does exist a serious school of military study and criticism superior to anything of the sort in the United States. When American writers deal with these subjects we can never be sure that they have not got hold of the wrong end of the stick. I preface this warning to a review of recent American articles on the United States and Europe from the military point of view, noting, however, that there is in them a remarkable unanimity which may be a mark of actuality.

The articles in question have been written as a result of the recent discussions about the increase in the number of groups in the United States Air Force. And the line of reasoning which the writers attribute to the government is briefly as follows. If Soviet Russia were to go to war in Europe, she could put 200 divisions into the field at once, exclusive of those of the satellite states. By comparison, the land forces which could be mustered by the states of the Brussels Pact—Britain, France, Belgium, Holland and Luxembourg—would amount to a mere handful. To begin with, the figure would be closer to 25. If other European nations were to enter into an alliance to prevent aggression, if the ideas of the United Europe movement were to be fully accepted and acted upon, there would be a considerable reinforcement; but the maximum strength available would not suffice to stand up to the Russians for more than the briefest period. Given time, West Europe might become much stronger, but the likelihood that it would be accorded time is remote. The air superiority of the Russians over the air forces of any or all the European nations which might oppose them would be almost equally great. Equipment has been modernized. It is known that great efforts have been made to improve features such as radar, in which Russia stood very low at the end of the war.

In these circumstances, say the writers, no forces stationed in Europe at the outset of a war could do anything but fight on the retreat, and it would be a rapid retreat, with not much fighting. There would be small hope of holding the Rhine. It might well not be possible to hold the Pyrenees. The Russians are not rapid movers, but it is considered likely by these observers that they would be over the Rhine in the course of a few weeks. They would be attacked not only by the aircraft of their European foes, but also

by those of the United States, but their air superiority—numerically, at all events—would be maintained in face of this powerful reinforcement. In numbers of aircraft Russian strength is twice, if not thrice, that of the United States; the present rate of production is higher. Given successful defense of the Atlantic routes, American land forces would take upwards of six months to reach the scene of action in strength. So, up to that point, the war would be for the Americans an air war, and one in which, again according to the theories advanced, they would expect to see Russia reach the Bay of Biscay and the Channel, together with the Norwegian coast and perhaps the Straits of Gibraltar.

But, the journalists go on to say, even then the United States could not pit herself against the Russians in Europe with land forces and has no intention of attempting what Napoleon and Hitler failed to accomplish. The aim would be to establish a ring of bomber bases round Russia and gradually to tighten it. Attacks would be launched against Moscow and the industries in its neighborhood and those of the Eastern Ukraine. It is claimed that, despite the movement of industry eastward and even beyond the Urals, the essential part of it still remains in European Russia, and would therefore be vulnerable. Britain, provided that it had been held, would be regarded by the Americans as an advanced air base, which might, of course, suffer the fate which has befallen some other advanced air bases in the past. The journalists are remarkably dispassionate about it all; they do not allow sentiment to influence their reasoning.

If this sketch were, in fact, to represent the ideas of the fighting services of the United States, the prospect before those European states which are inclined to resist Russian domination would be extremely bleak. Those on the Continent would be quickly overrun and occupied according to the program. Britain might not be, but physically her fate would be far worse than theirs. The Russians, having reached the Channel, would install long-range weapons with which to bombard this country, and the effects might be expected to be more deadly than those of the bombardments by V-1s and V-2s by the Germans. If the Americans were able to keep their air fields going, they would do so; otherwise, they would be compelled with regret to pack up and remove themselves to some more suitable base. It is also probable that the countries occupied by the Russians would become the secondary targets of the American bombers. The above is no parody of some of the prognostications which have been published. As I have said, there is no certainty that they represent the ideas of official American strategists; but if they do, the sooner they are revised the better.

Such a policy would in fact play straight into the hands of the "fellow-travellers" of Europe. What would be the good of the European Recovery Plan? What advantage to anyone would there be in the Brussels Pact? Nothing more discouraging to the nations which are striving to maintain their moral and political independence could be imagined. Such a course of action would not represent the Machiavellian astuteness of the United States, about which the communists so often warn us; it would represent mere frivolous inanity. Its chief weakness is that it would not further the cause which means so much, not to us only but to all humanity, that of avoidance of war. There does seem to be a reasonable prospect that if the non-communist states of Europe band themselves together in self-defense, and if they are assured of American aid, Russia will not choose to go beyond the stage of the "cold war" in which she is now manifestly engaged. If they come to believe that it is not worth while doing so, the hope falls to the ground. And if Russia concluded that she would be given the free disposal

of the whole European Continent, she might well decide that this would greatly improve her prospects in war and so become more inclined to war.

From the purely material point of view the policy would also be against the interests of the United States. Some of the nations might decide to join with Russia. In certain cases it could be done at a price, and this price might not, for the time being, involve the type of surrender which has been enforced upon the satellite states. The devotion to the Russian market of certain products of which Russia stands particularly in need might prove a form of cooperation which would last for a few years. The eventual fate of nations which enter the Russian camp but at the same time determine to preserve their own faith and individuality is exemplified by Czechoslovakia; but perhaps the anti-communist Czechs were not as bold and tenacious as they might have been. The element of cynicism in the policy outlined above would be likely to evoke cynicism in Europe also, and this might translate itself into forms of double-dealing which it would be difficult to detect. In short, if the United States needs the cooperation of the nations of democratic Europe, the best way of attaining it will be to show that she is prepared to share their sacrifices.

I suppose the truth is that the military policy of the United States is at present in a phase of flux and that one cannot expect it to become steady and firm until the political issues for the coming years have been settled. One of the best barriers against war would be the knowledge that the United States not only approved of the union of democratic forces in Europe but also intended to support it when created with all the means at her disposal, that she did not start from the premise of the complete loss of Europe if Russia went to war, and that in such an event she would not begin by adopting a policy which would safeguard her own comfort and prosperity at the expense of Europe. A war fought by the bomber alone would solve no problems, because it would end in a state of destruction, confusion, misery, and bitterness far worse than that which has followed World War II. I am sure that the most thoughtful of the American statesmen and military chiefs are well aware of this already, but it has been proved in this country that understanding and the power and courage to make the people understand do not always amount to the same thing. The European nations which have been encouraged by the United States to look across the Atlantic for moral and material aid in preserving their freedom merit the assurance that the United States regards preservation as feasible and holds out some prospect less chilling than that of reconquest by the bomb, perhaps by the atomic bomb. Human nature cannot be left out of account in war, and it has its limits. We want to avoid war and may be sanguine enough to say that we expect none; but if we should ever be driven to a war of defense, it is of interest to know the terms on which it is likely to be fought.

Mankind has approached an hour of decision wherein we shall either link all nations in an equitable peace, while contributing the strength to sustain it, or we shall risk ourselves and all good works to disaster and chaos once more.

General Omar N. Bradley

The Campaign of May-June 1940

Translated and digested by the MILITARY REVIEW from an article by Lieutenant Colonel de Cossé-Brissac in "Revue Historique de L'Armée" (France) No. 1, 1948.

The information presented in the following article was obtained by Lieutenant Colonel de Cossé-Brissac, Professor of History at the French École Supérieure de Guerre, *by personal interrogation of certain German generals, particularly Generals Halder and Guderian.—The Editor.*

WITH the crushing of Poland in September 1939, Hitler ordered the German general staff to complete the planning for "Fall Gelb" or "Yellow Case," the campaign against the western powers.

This task was given to the high command of the ground army under the direction and supervision of the high command of the combined armed forces, *Oberkommando der Wehrmacht* (OKW).

Because of the importance of the ground army, General Halder, chief of staff of the *Oberkommando des Heeres* (OKH), considered himself rightfully charged with the chief role in planning the maneuver. First, he laid down a certain number of hypotheses relative to the possibilities and probable intentions of the adversary. He had no doubts with regard to Allied intervention in Belgium. Powerful political motives forced England to make sure of a relatively deep penetration on Belgian soil, thus covering the continental coasts of the North Sea, holding the aerial threat to the British Isles at a distance.

Important strategic considerations led the French general staff to plan once again toward a decision in Belgium, which, for centuries, had been the meeting place of the French and German armies. This was the only area open to maneuver because of the Siegfried and Maginot Lines on the Franco-German border.

These *a priori* calculations were quickly confirmed. German air reconnaissance and the reports of agents had revealed the presence of numerous, large, high-quality French units on the Franco-Belgian frontier. The French units were those best suited for the contemplated maneuver—light mechanized divisions (active divisions, North-African divisions)—and, of course, there was almost the whole of the British Expeditionary Force. Study of the movements of the Allied forces during the different alerts of the fall and winter of 1939-1940 clearly revealed that these forces and the majority of the French mechanized reserves faced toward the Belgian frontier.

General Halder did not believe that the Allied armies would be able to extend their movements east of the Meuse. There were not enough troops on hand between Montmédy and Thionville to warrant a French north-south offensive across Luxembourg and the Ardennes. An eventual reinforcement of the French forces between the Meuse and the Moselle could be accomplished only by drawing on the forces manning the Maginot Line. General Halder judged that the French temperament would not permit weakening the Maginot Line, symbol of the mystic defense on which millions had been spent.

Halder likewise excluded the possibility of a French offensive on the left bank of the Rhine across the Palatinate. Such a maneuver would not lead to any worthwhile strategic exploitation, since it would terminate in the blind-alley of the Rhine-Moselle. Moreover, this threat would have been warded off by the Siegfried Line, which was strongly held by Army Group "C" under Colonel General Leeb.

Consequently, there was little probability that a German offensive directed from the east toward the west and aimed

at the envelopment of the Allied troops which were facing north in Belgium, could be threatened on its flank by a strong French attack from the south directed northward, east of the Meuse. Nevertheless, it was necessary to take every precaution for parrying any such eventuality by suitable covering action.

The German Problem

Assuming this to be true, the principal strategic problem for the German army was to fix and envelop the main body of the Allied armies in Belgium, in accordance with the classical doctrine of Clausewitz and von Schlieffen.

It was only logical that the maneuver that was planned should be conducted with maximum effectiveness. To this end, it was necessary immediately to prevent the Allied armies from anchoring themselves on the extremely difficult barriers of the Albert Canal and the Meuse. The problem was one of speed. It was necessary to reach these barriers ahead of the Allies, as rapidly as possible, and to insure bridgeheads beyond them which would permit exploitation later.

But it was necessary to fix the Franco-British fighting forces deeply enough into Belgium, and firmly enough, to remove all possibility of their disengagement and retreat.

It was evident that the enveloping maneuver would be infinitely more effective if it shut the Allies up in a limited area north of the fortified line and deprived them of all opportunity for reembarkment.

Exploitation in the direction of Abbeville, although indicated in no uncertain manner in the German atlas of the western campaign, had not been fixed *a priori*. It was not marked till afterwards. It would have been preferable to have shifted this direction of effort farther to the north, along the coast of the North Sea and at least as far as Dunkirk.

To begin with, before January 1940, the double maneuver of "fixing and enveloping" was incumbent only on the group of armies under Colonel General von Bock, who had at his disposal for this purpose, von Kluge's army south of the Meuse, von Kuchler's Eighth Army, and von Reichenau's Fourth Army. The two latter armies had the task of fixing the Allied fighting forces frontally. Von Kluge's Fourth Army alone would have assumed the task of carrying out the new development by pushing through on the Belgian Meuse between Namur and Givet. All of von Rundstedt's group of armies, facing south, would have insured the covering of the operation.

The main body of the armored divisions was assembled farther north at that time in anticipation of intervention in conjunction with von Bock's group of armies.

Plan of Attack Changed

In January 1940, however, a German aviator landed in Belgium carrying papers which informed the Allies of the German intentions, whereupon the German high command decided to revise their original plan, giving more emphasis to the envelopment, and rolling up the French fortified frontier itself. It was then decided to seek a new point of penetration farther south for the enveloping forces. General Halder's attention then was called to the advantages that would be offered by the Sedan area. He knew that the fortifications constructed by the French army north of Montmédy were less dense, less strong and less well-equipped than those of the Maginot Line. He also was aware of the fact that they were manned only by reserve divisions. He therefore resolved to break through at Sedan.

The missions of the two army groups were changed to fit the new plan. The von Bock group of armies no longer had any mission but that of holding. The mission of the envelopment forces, and of the armored divisions necessary for its proper execution, were transferred to von Rund-

stedt's "A" group of armies, which faced south and would protect the envelopment.

The crossing of the Ardennes presented many problems. Due to insufficient roads, it was not possible to engage all armored corps in front positions at the start. General von Manstein, at that time General von Rundstedt's chief of staff, arranged this difficult maneuver: the choice and assignment of routes, initial echelonment, progressive movement ahead, intervention by the large armored units, antiaircraft protection, etc. He had previously been advised by Generals von Kleist and Guderian, who were experts in the use of armor.

The plan was then submitted to Hitler, who approved it. According to General Halder and General Guderian, this maneuver did not originate with Hitler. It was the logical result of the series of arguments which we have just examined. But Hitler subsequently took the credit not only for having assumed the responsibility for the maneuver, but also claimed to have originated it.

General Halder refused, in accordance with strategic tradition, to order the development of the entire operation in advance. He insisted that his plans could extend no farther than the first battle. He was unwilling to judge beyond this point the reactions of the Allies who, after all, could have reacted differently than was expected. He limited himself to sending the fastest and most modern elements of the German army, paratroops and tanks, as far as the Albert Canal and the Meuse as fast as possible. It had not been planned to occupy the banks of these barriers, but to get there ahead of the Allied main forces, gain possession of the crossings, and to establish favorable bridgeheads beyond them. To be sure, the Polish campaign had shown that paralyzing action could be expected of the armored arm, supported by aviation. But it could not be determined in advance what type of resistance would be encountered this time. Without doubt, the Germans remembered the surprise the English and French gained in World War I with tanks. The German general staff of 1940 was too well aware of the excellent studies that had appeared in the military press of the two western powers, were too well informed of the creations of Franco-English industry in the field of war matériel, not to include in its calculations the possibility of defensive forces and reactions on a level with what the Germans had to offer.

Besides, the difficult terrain of the Ardennes presented a very obvious contrast to the vast plains of Poland. And lastly, even in the German army, motorization still had its skeptics, some of whom, such as General Busch, commander of the Sixteenth Army under von Rundstedt, were men of considerable influence. Be that as it may, the German high command certainly admitted the possibility of having to fall back in the great decisive battle on the combined action of the traditional infantry-artillery team. In this case, the German army would have to mark time while the large infantry units brought their main forces forward for battle. General Guderian even claimed that a delay of six weeks had been anticipated in the conferences of army commanders with Hitler. Hitler is claimed to have insisted on the necessity of not venturing beyond the first objective mentioned above. As is well known, this first phase of the offensive, the advance to the Albert Canal and to the Meuse, had been given to the motorized formations.

North of the Albert Canal, in Holland, the 9th Armored Division and the SSV Motorized Division were to push ahead as far as La Haye, over the Dordrecht bridges, thus supporting the 7th Division of Air Infantry; and General Hoeppner's XVIth Armored Corps was to cross the Meuse at Maestricht and then seize the Albert Canal (guarded there by the mod-

ern Belgian fort of Eben-Emael) with the aid of parachutists of the 7th Division of Air Infantry.

South of Amur, between the Meuse-Sambre and the Franco-Belgian frontier, composed of the XIXth Armored Corps of General Guderian, in the lead from the beginning, and charged with the Sedan affair; the XIIth Armored Corps of General Reinhardt, first in the second echelon,

the Hoth XVth Armored Corps was to cross the Meuse.

Lastly, the principal operation south of Givet was given to von Kleist's armored group in General von Rundstedt's "A" group of armies. Von Kleist's group was but afterward called on to operate north of the XIXth in the Monthermé-Nouzonville sector of the Meuse; and the XIVth Motorized Corps of General Wietersheim, whose three divisions moved in the wake of the two preceding corps.

In April 1940, General Guderian began preparing detailed plans for his corps, covering day by day operations at least up to D-day plus 5. His three division commanders and the principal officers in charge of the execution of the operation had been instructed carefully concerning the role which they had to play in the action. The detailed plan prepared by General Guderian did not stop at the Meuse but extended far beyond, at least as far as the breakthrough of the French fortified position. General Guderian had not acquainted his superiors with the details of his intentions and it is probable, moreover, that he himself was not very well informed, except in a general way, of the French disposition. Thus, according to his own statement, he did not know the limit of action of the Ninth and Second Armies, at least west of the Meuse, at the point where his intervention was to create the most decisive results. Without doubt, this procedure contributed greatly to the speed of the XIXth Corps. It may be asked, however, what would have been the result if some unforeseen element had jammed this well organized machine.

The Operation

On the afternoon of 13 May, after extensive preparation by simultaneous action of the XIXth Corps artillery and *Stuka* planes, General Kirchner's 1st Armored Division, preceded by the *Gross Deutschland* Motorized Infantry Regiment, obtained a footing on the Iges Peninsula, forced the French fortifications, took Marfée woods that same evening, and pushed its way into the rear of the French sector beyond the artillery positions. On 14 May, General Guderian went into action, first facing south toward the Stonne-Mont Dieu massif, where the reserves of the Second French Army counterattacked him in vain. He had simultaneously seized possession of the crossings of the Bar and of the Ardennes Canal, at Omicourt and at Malmy.

Toward 1400, he decided to have the 10th *Panzer* Division, which had crossed the Meuse west of Bazeilles and Balan and had joined forces with the *Gross Deutschland* Regiment, cover him and continue to face southward at the Stonne massif, and eastward in the Bulson, Raucourt and Flaba area. He was now ready to make his principal effort west of the Bar and the Ardennes Canal, pushing the 1st *Panzer* Division in the general direction of Vendresse, Bouvellemont, and Rethel. In the north, the 2d *Panzer* Division was to direct its efforts toward Flize, and outflank the French forces in the Mazarin forest on the north and west. General Guderian claims this important decision had already been made by him in the plan drawn up in April.

Violent fighting continued on 14-15 May throughout the entire Mazarin forest north and south of the Vendresse Omont clearing. It ended about midnight the night of 15-16 May with the taking of Bouvellemont, which had been defended by the 3d *Spahis* Brigade. General von Kleist then called Guderian's attention to the strict order given by Hitler before the beginning of the operations to limit action to the maintenance of a large bridgehead southwest of Sedan. General Guderian himself desired to take up the pursuit. He based his argument on a French order, dated 14 May, taken on the field of battle, which he claimed had been signed by General Gamelin. This order insisted on the necessity of blocking the drive of the German tanks at all costs. After a lively discussion, he finally succeeded in obtaining authorization from General von Kleist to continue his drive westward during the day of the 16th only. The evening of the 16th, the 1st *Panzer* Division was at Marle, and General Guderian personally was at Montcornet. On the morning of the 17th, General von Kleist repeated his prohibitory order, but General List, who also had come to see Guderian, intervened and obtained

authorization for him to push his reconnaissance as far as Saint-Quentin. Guderian was unable to get underway until about 1600.

According to Guderian, "the counterattack of the de Gaulle groupment on 17 May penetrated as far as my command post, but produced no effect on the forward movement of the divisions." On the evening of the 19th, he obtained permission to push in the direction of Amiens.

XVIth Armored Corps, with General Rommel's 7th Division at its head, pushed far into the area held by the Ninth French Army. It is likewise certain that the German high command immediately, and with great skill and speed, grasped the situation that was revealed by the deep rupture of the French fortified front at Sedan and the collapse of the Ninth Army position west of Dinant. Moreover, the dispositions of General von Brauschitsch, chief of the

German tanks during the campaign in France.

It would, perhaps, be going too far to infer that the personal action of General Guderian dragged along the greater part of the armies of the von Rundstedt group into the breach opened in the center of the French forces, almost in spite of the German high command. On the contrary, General Reinhardt, commander of the XLI Corps on the north of the XIXth (according to the German atlas of the western campaign), pushed advanced units into the Montcornet area on the evening of 15 May. Also, on the north, in Belgium, Hoth's

OKH, to which attention was called by General Halder, left the decisions of the high command a function of the Allied reactions, but did not exclude the possibility, in case of success, of continuing the vast, enveloping operation begun by the mechanized forces. The proof of this is that General von Rundstedt, being duly orientated, immediately pushed the mass of his infantry divisions westward, meanwhile covering himself on the south against an eventual French counteroffensive.

We should not, however, ignore General

Guderian's seizing the initiative. There is no doubt that his actions affected the course of events and kept ahead of the countermeasures of the French General Headquarters. General von Brauschitsch, far from interfering with this audacious but calculating chief, was to render him marked homage a month later; General Guderian, who had reached Langres, had asked authorization to push on at top speed to Besançon and the Swiss frontier in order to envelop the eastern group of French armies.

The chief of the OKH merely sent him this laconic message: "General Guderian of the armored forces must make his own decisions, and not permit himself to be interfered with by any of the authorities which might be placed over him."

Conclusions

The western campaign did annihilate the resistance of the French army in unexpectedly short order. But the enveloping operation, perhaps because of its great extent, was not able to accomplish the complete encirclement and destruction of the northern group of Allied armies. With great tact, General Halder discreetly reproached Field Marshal von Bock for not having pinned down the Allied armies in Belgium, and for permitting them to fall back to the sea in good order. Hitler, especially, committed the great mistake of suddenly stopping the action of the German armored forces against the Allied bridgehead, already so tragically reduced. In reply to the criticism of the chiefs of the OKH and the armored arm, Hitler ordered that Dunkirk be abandoned to the *Luftwaffe*, a task which, quite evidently, exceeded the possibilities of German aviation. This was the first of Hitler's great strategic errors. On this account, the Dunkirk reembarkation and the saving of the British Expeditionary Corps, prevents the German maneuver from being known in history on a par with the battles of Cannes or Tannenberg. The outcome of the war was not immediately settled.

Would it have been possible at this time to invade and defeat England?

General Halder declared that he was in favor of a landing in England. This operation was not possible before the liquidation of the French army, which still remained a force that could not be disregarded. But invasion should have been attempted at any cost after the Franco-German armistice, and was, indeed, possible in August or September 1940.

Soviet Views on Winter Offense

Translated and digested by the MILITARY REVIEW from an article in "Informations Militaires" (France) 10 June 1948.

THE Soviet army during four years of war against Germany gathered a considerable amount of information relative to the conditions under which military operations are conducted in winter. In "Voenni Vestnik" No. 21, 1946, Major General Yanovski published an article pertaining to this subject which, with material from other sources, is the basis for the following analysis.

Winter operations now have assumed a greater role and importance than during wars of the past. Operations are now quite universally conducted in the winter. The snow, freezing temperatures, short days, and changeable weather, all make the organization of offensive combat more complicated and its preparation longer. During the winter months, movement is difficult across country, and the snow slows

down movement of units, which are able to operate only on skis. Winter limits the depth to which missions may operate.

The slowing down of movement increases the importance of combat by fire, resulting in greater consumption of ammunition. More time is required to assemble artillery and to modify its grouping during combat. When the layer of snow reaches a depth of 50 centimeters, it limits the maneuverability of armor, which can then be used only over short distances. In addition, special measures must be taken to avoid injuries to the men due to the cold, and in employing most equipment.

Meteorological conditions—fogs, falling snow, and ice—make the reconnaissance of enemy positions more difficult by limiting visibility. One must, therefore, make good use of the periods of clear weather for photographing the enemy front, battery positions within a radius of 15 to 18 kilometers, and the road and highway networks. As a matter of fact, after heavy snowfalls, it often happens that the regular routes are not used and a system of trails is used which does not show on the map. This can only be discovered by aerial photography. Such information is indispensable if the movement of enemy reserves is to be determined. Moreover, snow often hides antitank obstacles and obstacles for halting the movement of infantry. Snow likewise conceals mine fields. Rivers and lakes which are solidly frozen over no longer constitute obstacles, providing the enemy does not break up the ice with explosives. On the contrary, frozen waterways at times constitute valuable routes for reaching given objectives. Marshy terrain frequently becomes passable for all arms. Zones normally inaccessible to armor become good routes of attack. Forests of leaf-bearing trees provide less concealment, especially against aerial observation. Marks left in the snow by troop movements provide valuable data to aerial observation.

Artillery

The mission of artillery is the same as in summertime: the preparation for and support of the infantry attack over the entire depth of the enemy defenses. Decentralization in the employment of accompanying artillery occurs during the attack, whether the artillery be mounted on runners or drawn by caterpillar tractors. This mode of traction is, at times, indispensable in case of very deep snow and it demands great care in its organization in those cases where the maneuver cannot be supported solely by shifting artillery fire.

Coordination of the artillery and infantry effort is achieved by a carefully prepared fire plan and through the use of prearranged signals or radio.

It is necessary to increase the number of artillery observation posts and locate some of them even in the infantry formations. It is, in fact, more difficult in winter to designate targets or objectives, since the snow causes terrain features to disappear, modifying relief and the appearance of objects.

Falling snow and fog interfere with the observation of fire. Often, only unobserved zone fire is possible. This type of fire is insufficient in preparing for an infantry attack. Therefore, it is important that the guns destroy the enemy observation posts with direct fire.

Freezing temperatures increase the resistance of earthworks, making it necessary to employ artillery pieces with a caliber of 122-mm or greater for their destruction and to choose carefully the most suitable type of fuse for the task.

The employment of a large number of direct fire pieces, as practiced by the Soviet army, had several advantages. This type of fire produces greater destructive effects, and permits shortening the duration of the artillery preparation, with consequent economy of time and ammunition. Conduct of fire is simplified, and fire is

rapidly transferred from one target to the other. All artillery of the infantry battalions and regiments, and part of the division artillery, participate in the preparation for the attack. In certain missions which are beyond the capabilities of division artillery, 152-mm howitzers are also employed. The fire of the direct fire pieces is often added to that of the others at the end of the artillery preparation. Certain guns do not disclose their presence but open fire only at the moment when the infantry launches its attack. Their role is the destruction of enemy weapons, inclusive of antitank guns, at the moment when the infantry attack starts.

The technique of changing artillery positions depends not only on the nature of the terrain and the depth of the snow which covers it, but also on the enemy's fire. Guns are ordinarily shifted by the crews themselves, or are towed. Both regimental and division artillery fire successive concentrations during the course of the attack after the preparation has given particular attention to the destruction of antitank defenses. In addition, the artillery prepares concentrations in advance on probable antitank locations and on centers of resistance.

Support of Infantry by Armor

The employment of tanks when snow covers the terrain and low temperatures prevail is more difficult from the technical point of view. The snow reduces their mobility, their radius of action, and their capacity for moving over obstacles, such as holes, ravines, and crevasses, which are often filled with snow. The covering of snow hides the irregularities of the terrain from view.

If the layer of snow is less than 50 centimeters in depth, armor cooperates in the attack with the infantry, as in the summer. If the snow exceeds 50 centimeters, the employment of tanks becomes difficult, and they cannot be used if the depth exceeds 79 centimeters. In addition, even a light snowfall blocks the sighting slits, and makes it impossible to use optical equipment. The crews lose a large measure of their observational ability, the accuracy of their fire is lessened, and the tanks become less maneuverable. A slowly moving tank is a vulnerable target. Lastly, a crew forced to remain for a protracted period in a tank in very low temperature is exposed to frostbite.

In winter, tanks operate in closer contact with the infantry than under ordinary conditions.

Special Organization for Offense

It is necessary to give infantry regiments more time for the preparation of their attack and for the organization of a coordinated effort in winter. The days are not so long; it is well to allow more time between delivery of the order and the beginning of the action.

Winter also produces modifications in the organization for attack. Frequently in winter the defense front is not continuous but contains intervals between centers of resistance. This provides the attacker with favorable opportunities for turning or enveloping movements and for encirclements. The enemy should therefore be attacked on the flank and from the rear, while being pinned down from the front.

It has been mentioned that reconnaissance should be conducted with great care. Scouts ordinarily operate at night, or take advantage of snowstorms which facilitate the movements of patrols. It is of particular importance to learn the whereabouts of roads, highways, and trails, their condition, the depth of the layer of snow, and the possibilities of movement; and to study the relief of the terrain in depth, particularly if the use of tanks is contemplated. Patrols must make every effort to learn whether defensive works have been constructed of snow, whether

slopes are ice-covered, whether there are open places in the ice of rivers and lakes, the possibilities of infantry movements without the use of skis, the possibilities of tank movements, the possibilities for artillery maneuver and positions, and the zones where the layer of snow is deep. These patrols, with a view to the employment of tanks, must also ascertain the whereabouts of antitank weapons and tank fields.

General Yanovski cites an example from the battle of Moscow in the Volokolamsk sector in December 1941. A position held by the Germans had been so carefully organized on its southern and eastern slopes that its attack was practically impossible. By covering these slopes with water, which had frozen, they had produced a coating of ice in addition to other obstacles. The northern slope was less carefully prepared, and was not ice-covered. The height was captured in a night attack carried out on the north side.

It is more difficult in winter to choose the direction of attack. A zone which would have been advantageous in summer may no longer be acceptable in winter, and vice versa. When the snow cover is deep, a direction must be chosen where roads and highways are numerous enough to permit the attacker to make use of all his combat forces. These roads and highways must have few breaks, if the advance and maneuver in the rear of the enemy position are to be rapid.

This 153-mm Soviet gun, originally captured by the Germans from the Russians and transported to France, was recaptured by US forces in the invasion of Northwest Europe in 1944.—US Army photo.

Combat

The jump-off position is occupied during the night, shortly before dawn, to avoid unnecessary losses from cold and to insure surprise. If the men attack on skis, the distance between the jump-off position and the objective may be greater;

if they do not attack on skis, the distance may be less.

As a general rule, infantry on skis attacks only an enemy engaged in establishing himself defensively. The attack is then carried out swiftly. Both the movement and fire of ski forces are executed without the removal of their skis. Advances executed in this manner expose men in an upright posture to the fire of the enemy. The attack must, therefore, be carried out under the protection of all available supporting fire.

Against an organized defense system from which heavy fire is being received, the attack is executed without skis, starting from trenches constructed in the snow beforehand, as for an operation in normal weather. The enemy is held from the front, and an effort made at the same time to outflank him. The attack occurs shortly before dawn, or at dawn, in order to have as much time as possible for action. Night attacks have often succeeded even in cases of numerical inferiority. There have been cases where success was achieved at night after the fighting had failed during the day. An effort is made by groups armed with automatic weapons to penetrate the attacked positions and get at the enemy from the flanks and rear.

Counterattacks are repulsed by tanks and by battalions of ski troops. Groups of ski troops protect the flanks in order to block enemy ski forces. When success begins to develop, pursuit of the enemy is begun by ski troops supported by tanks or self-propelled guns and the detachment of engineers, in order to get to the flanks of the enemy, cut off his retreat, and insure his encirclement and destruction.

Organization of the Rear

In winter, certain abnormal features characterize the organization of the rear areas. All means of transportation, especially automobiles, are more closely bound to roads and highways, and so are particularly exposed to attacks by enemy aviation. The tonnage transported and the speeds at which vehicles may operate are greatly reduced, and it often becomes necessary to replace wheeled vehicles by sleds or to mount them on runners. Cold affects the motors of the vehicles, reducing the effectiveness of the lubricants and freezing the water in radiators. It becomes necessary to use special lubricants and to protect radiators with fabric or fur covers.

Ammunition supply off the roads and highways is handled during battle by sleds constructed from skis, or by carriers, pack animals, or dogs. These transport difficulties in winter frequently lead to augmenting the food and ammunition reserves carried by soldiers, who might carry, at times, as many as 250 rounds of ammunition and three or four grenades.

The medical service also encounters special difficulties in winter operations. The wounded are carried over shorter distances; the company, regiment, and battalion aid stations are brought closer to the front lines. An effort is made to select locations sheltered from the wind and to provide them with straw, to protect the wounded men from exposure by using blankets and fur bags and to keep them warm by chemical means. The wounded are evacuated on stretchers mounted on skis. The seriously wounded, and their weapons, are evacuated on sleds sometimes drawn by dogs.

For protection against airborne forces, ski troop detachments must be provided with machine guns mounted on skis, and with hand grenades and mobile signal equipment.

The experiences of World War II show the great importance of special training of troops for winter warfare: physical training and hardening of the personnel, capacity for adaptation to winter conditions, and, particularly, practice with skis.

With snow depths of 20 to 30 centimeters, infantry is not able to march at a rate greater than two to three kilometers per hour, while a skier of medium ability can travel at a rate of from eight to 10 kilometers, and a company of ski troops at the rate of from six to eight kilometers per hour. A regiment on skis acquires greater maneuverability, which is of inestimable value in war.

Breakthrough at Seros on the Catalonian Front

Translated and digested by the MILITARY REVIEW from an article by Captain Fernando de Salas López, Instructor at the General Military Academy, in "Ejército" (Spain) July 1948.

OPERATIONS on the Catalonian front began on 23 December 1938. The Nationalist command planned a vigorous drive to end with the seizure of the entire region. For this campaign, the Army of the North deployed its corps from the north to the south in the following order: Urgel, Maestrazgo, Aragon, Corps of Volunteers, Navarra and Marroquí. In addition there was a reserve of two infantry and one cavalry divisions, making a total of 306,000 troops.

The Loyalist situation was clearly set forth in a written report to the Loyalist Defense Minister: the worn-out units from the battle of the Ebro had not received replacements for the greater part of their casualties, which numbered 10,000 to 15,000 out of a total of 80,000; a scarcity of weapons noted before the engagement at the Ebro was now even greater; due to the limited capabilities of matériel and men, the Loyalist Army with a strength of 280,000 had the effectiveness of only 100,000 men.

The Loyalists had information about the concentration of Nationalist troops and therefore expected an offensive. On their available information, the Loyalists formulated the following plan: first, to resist to a maximum in all sectors under attack; second, to launch a counterattack, in case of a penetration, with the three corps held in reserve; and finally, if compelled, to withdraw to previously prepared defenses in the rear areas. The Loyalist forces in Catalonia were organized into two armies, the Loyalist Army of the East and the Loyalist Army of the Ebro, with a total of seven corps.

The Loyalist plans for other fronts were vast and more hopeful. They contemplated a major offensive in the center, for the purpose of drawing Nationalist units from the Catalonian front.

The first attack was planned to take place against the right of the Nationalist forces from the south, by a landing and attack at Motril to help the main effort by engaging the Nationalist reserves. The commander of the Loyalist Central Army was against this plan and for that reason it was not followed.

The main effort was made on the Cordova-Penarroya front by three army corps. They tried to open the way to Seville but failed; and the secondary attack, aimed at cutting the lines of communication between Madrid and Extremadura, also failed. Neither action slowed the tempo of the operation in Catalonia.

Development of the Operations

When the battle of the Ebro ended, the Nationalist Army of the North was divided into two forces. One was kept on the Catalonian front under the same name and command of General Davila. The other joined the Castilla and the Galicia Corps, operating in the direction of Valencia, thus

forming the Nationalist Army of the East under the command of General Orgaz.

The mission of the Nationalist Army of the North was to break the enemy front at the bridgehead at La Baronia, Tremp, and Aitona-Seros; secure the line: Ponts—Agramunt — Tarrega — Espluga Calva — Vilanova on the road that runs from north to south across Catalonia, joining Puigcerda and Seo de Urgel with Reus; and to reduce the canal region of Urgel and the defensive works of the lower Ebro. In this manner it was planned to defeat, isolate and destroy the main Loyalist forces deployed along the middle and lower Segre.

To achieve this objective the forces were grouped as follows: the Urgel Corps was in the Tremp sector on the north; the Maestrazgo Corps went to the La Baronia bridgehead; in the center, in the Balaguer—Lerida area, was the Aragon Corps with a cavalry brigade and a tank regiment; the Navarra Corps and the CTV had the bridgehead at Seros; the Ebro area went to the Marroqui Corps.

Action on the Catalonia front started on 23 December 1938, with breakthrough operations at Tremp, La Baronia and Seros.

The Urgel Corps, in the Tremp sector, left Matasolana and attacked towards Roca Alta at the eastern end of the Monsech range.

The Maestrazgo Corps attacked from the bridgehead at La Baronia towards San Mamet.

Both attacks were directed towards Artesa de Segre and initially the operation progressed normally with the units penetrating several kilometers. The rapid advance slowed down for a time, due to difficult ground and to the heavy enemy fortifications which were organized in such depth as to include even the town of Artesa.

At the Seros bridgehead, the ground favored the breakthrough. On the first day the Navarra Corps and the Corps of Volunteers overran the Loyalist defensive system and reached the defending artillery areas, something which is considered a requirement in order to call a breakthrough successful.

The Navarra Corps moved south from the bridgehead towards Mayals, at the same time flanking the hill mass of Monneneu and proceeding towards the Monsant range, seeking contact farther south with the Marroqui Corps at Fayón.

The Corps of Volunteers moved northeast in order to capture the assigned objectives of Borjas Blancas and Belianes.

This penetration was executed by infantry, with the support of aircraft, 77 batteries of field artillery, and seven antiaircraft batteries. The artillery fired a four-hour preparation, which helped to crush the enemy, morally and materially.

The three brigades of the 56th Loyalist Division began to weaken before the Nationalist infantry. In the assault, the Nationalist troops routed the defense, capturing all the weapons and positions that had been held by the Loyalists.

Several antitank guns and two batteries of 124-mm guns were captured during the day. In the evening, prisoners were captured on the road from Sarroca to Llardecans, 16 kilometers from the line of departure. From then on the attack was continued in strength and movement, the two army corps seizing 3,500 prisoners and 2,000 square kilometers of ground. Confused, the Loyalist command was able only to make several flanking attacks at Borjas Blancas.

The map shows that the three main roads converge at Lerida. On the north is the Pirenaica de Seo de Urgel-Puigcerda; in the center, the road from Barcelona; on the south, the road from Tarragona. The attack was aimed at seizing these three axes of penetration, without making a costly frontal attack against Lerida. There-

fore, the troops from Tremp and La Baronia hit Artesa de Segre, and those from Seros captured Borjas Blancas. Then the Aragon Corps advanced through the center from its base in Balaguer, capturing Mollerusa on the road to Barcelona. At the two important towns of Artesa and Borjas Blancas, the Loyalists concentrated their resistance. These reserves were defeated, and from then on the campaign in Catalonia picked up speed. Within a short time the total liberation of the area was completed.

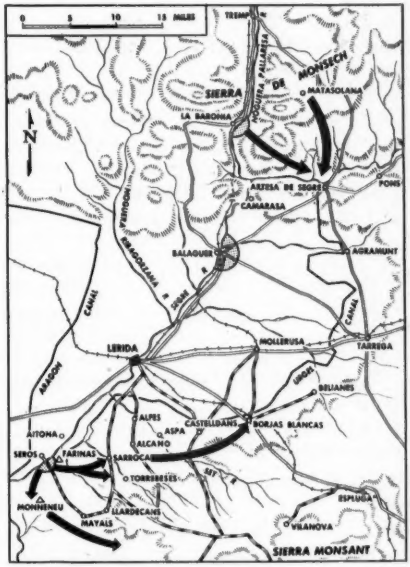
Assault on Mount Farinas

Not all positions on a defensive front have the same tactical value. Some are known as "key" positions, whose loss means the rapid collapse of adjacent positions. These key positions are invariably well prepared for defense, and are the main objectives of the attacking force.

The Loyalist positions surrounding the small Nationalist bridgehead at Seros were more or less the same altitude as the ones occupied by the Nationalist units. Among all of them, the key position of Mount Farinas was outstanding, since it was on the north, 100 meters higher than the surrounding area, and it commanded the left bank of the Segre River.

The attack to capture this position was carefully planned. All elements knew their mission, their position on the line of departure, and the portion of the objective assigned to them. The units arrived on the line of departure at night, crossing the bridge within the range of Loyalist machine guns on Mount Farinas. The concentration of troops kept increasing during the night. The battalion that had been defending the bridgehead was still there. Observation and command posts, with their telephone lines, were intermingled in the trenches. The battalions that were to assault the positions waited for their orders on reverse slopes and in ravines opposite their objectives. Ammunition was stacked in high piles on the ground. An 81-mm mortar battalion was emplaced in the small area. Just before the attack, light tanks arrived.

Since the bridgehead was so small, only four square kilometers, and since it was desired to have enough troops to exploit a breakthrough and keep the enemy from reorganizing and delivering counterattacks, the lines of departure for the different units were so close to each other



that each 124-mm shell caused casualties among the Nationalist troops. However, the hostile artillery was silenced by counterbattery fire.

The mission of capturing Mount Farinas was given to the Black Arrow Division of the Corps of Volunteers. They used a divisional assault company (specialized in this type of operation) and a battalion, launched from the bridgehead. Following immediately behind them were the 1st and

2d Regiments of the Division, advancing frontally after crossing the river.

The assault company advanced as the first echelon. To mark the line of advance for regulating artillery and mortar fires, rectangular pieces of white cloth were fastened on the backs of the infantrymen; the white marks could be distinguished from a distance and served as a moving stake on the terrain. Thus the artillery and mortar fire was maintained until the last minute before the assault troops jumped into the enemy forward positions. Then, with perfect liaison, the artillery increased its range and changed targets.

The only disadvantage in the use of the white markings was that when the infantry had to halt or cut wire entanglements, the enemy, from commanding positions, could see the white cloths and fire on them. But this inconvenience was offset by being able to reach the defensive positions before the enemy could leave his shelter.

Once the positions were reached, the penetration was continued. Groups of captured prisoners were left to be picked up later. Combat was conducted inside the positions according to the doctrine of combat for the individual soldier, that is, to approach the branches of the trenches running parallel to our axis of advance, some troops following them on the outside, and others using the cover of the trenches. Loyalist weapons and their respective crews were disposed of by use of grenades.

After the assault ended, the 2d Regiment continued the advance and reached the artillery positions. The operations continued, and the Black Arrow Division occupied Alcano on 25 December, Aspa on the 26th and Borjas Blancas on 5 January.

"Tommy Go Away"

Digested by the MILITARY REVIEW from an article by Arthur Bryant in "The Illustrated London News" (Great Britain) 4 September 1948.

IT must be nearly 60 years since Kipling reminded us of our national habit—a very unprepossessing one—of acclaiming our soldiers in time of danger and treating them with contumely in time of peace:

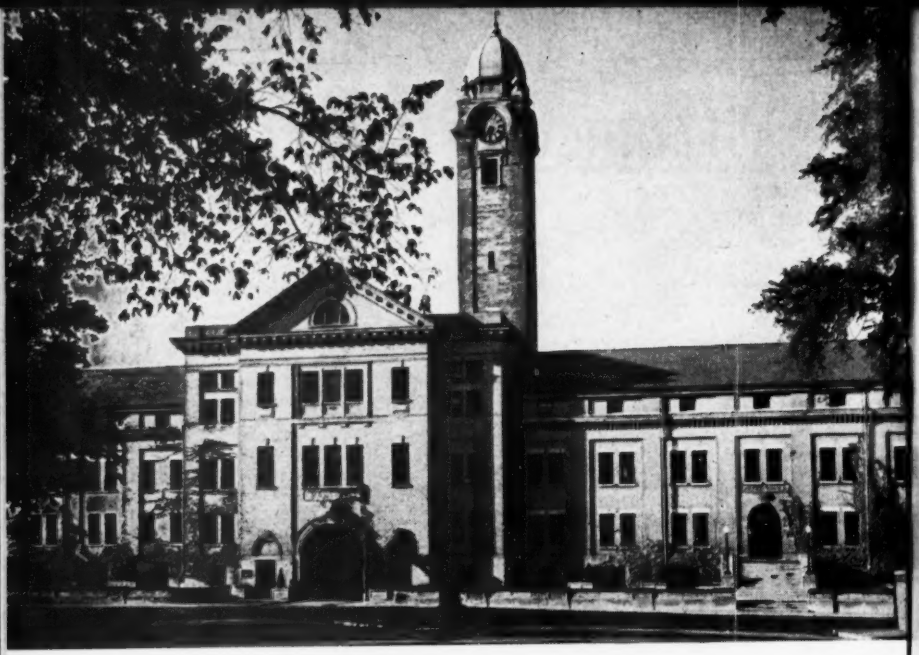
> Oh, it's "Tommy This," and "Tommy That," and "Tommy go away,"
> But it's "Thank you, Mr. Atkins," when the guns begin to play.

Perhaps the bitterness of the rebuke has lost a little of its justice, and therefore of its sting, by virtue of the facts that at some time or other during the past 34 years most men have had to turn temporary soldiers, and that this interruption in civilian lives and avocations has been necessarily attended in many cases by even greater temporary sacrifices than the professional soldier has habitually to make. Whereas military service is part of a soldier's career, and in that sense sometimes attended by professional success and advancement, to a civilian it cannot be anything but an interruption and perhaps fatal handicap to the ordinary business of life. Yet the fact remains that at the outset of our wars—and the outset is usually by far the worst part of them—it is the regular soldier who has to bear the brunt and pay the price of our national neglect of our Army in peacetime. What proportion, one wonders, of those who crossed to France with the first seven divisions in 1914 survived as whole and hale men into 1919? Thousands of British Regular soldiers who made the same crossing in 1939 spent the next five years of their lives in the wretched servitude and

deprivation of a German prison camp. It was not their fault that they did so; it was ours. We failed to give those whom we expected to defend us the wherewithal with which to do so. We had grudged spending our money on such an object. Many of the finest men of our age are dead as a result of that ignominious refusal.

All this makes it the more incumbent on us to treat those who do our soldiering for us with reasonable justice and consideration in peacetime. When war comes they have to shoulder a greater burden of danger than any; and it is only just that when there is no war they should be allowed a reasonable share of the happiness other men know. They ought to be allowed to earn enough to keep themselves and their families without harrowing anxiety, not to be deprived of common association with those they love more than is strictly necessary for the safety of the country, to have a reasonable chance of the pursuit of happiness and recreation that all men, in their varying ways and walks of life, expect and require. Our talk of social justice would seem a sham if this were not so. Is it so? Are we giving social justice to the officers and men of the British Regular Army?

The rates of the noncommissioned officer's and private soldier's pay—never generous—have lately been raised. So, theoretically, has the officer's. But neither has kept pace with the rising cost of living and, in the case of the latter, the advantage of the increase has been more than offset by the new principle of taxing most of his allowances, and this at the crushing rate of present-day direct taxation. The worse sufferer is the married officer of middle rank—the backbone of our and every other Army. If lodgings were available for his family at reasonable rates in the places in which he has to live to serve the country, he could support a wife and children on his pay, not, certainly, lavishly, but decently. Theoretically, the Army does provide lodgings at rents proportionate to the pay and obligations of those by whose service and unquestioning obedience it lives. In practice only a small proportion of officers have any present chance of obtaining such lodgings. The remainder have to find, out of an income which, after taxation, bears little relation to the remuneration of those holding positions of comparable responsibility in civil life, not merely the normal inflated rents of the present time, but, frequently, rents far in excess of this, occasioned by the extreme scarcity of accommodation in the places where government requires Army officers to live. It has been calculated that the average rent of furnished accommodation in garrison areas in this country is about 14 times higher than the official rent charged for government quarters. Married officers without private means who are unable to obtain such quarters have, as a result, either to live apart from their families and so forfeit, not only in war but in peace, the joys of normal home life, or to incur a day-by-day expenditure which is in excess of their earnings. Since by the nature of their profession they cannot hope to increase or supplement their earnings, the officers must sink gradually into a morass of debt. The correspondence I have received from hundreds of serving officers with wives and families shows beyond all doubt the fearful dilemma which faces nearly all who are without private means. Many are sadly contemplating resigning their commissions and chosen career and some have already done so, not out of choice, but out of sheer necessity. Unless the Treasury and the statesmen who control our policy can be prevailed upon to concede, in fact as well as in theory, that an officer of the British Army is entitled in time of peace to be able to afford the responsibilities of matrimony and parenthood, the efficiency of the Army and the safety of the country may soon



COMMAND AND GENERAL STAFF COLLEGE

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Creating a Sound Military Force

General Omar N. Bradley
Chief of Staff, United States Army

The following statement by General Bradley was delivered as an address at the third National Industry Army Day Conference in Boston on 4 February 1949.—The Editor.

IN the creation of a sound military force for the armed defense of the nation, there is no place for free competitive enterprise among the separate services in the business of fighting a war. Security is a cooperative venture; it is not a competitive race. To forewarn aggressors and to construct effective military might, we are in need of partnership, not partisanship; concern for the safety of this nation, not the survival of our arms.

Because we insist that every American armchair has a right to its own homegrown general, the agreement of our armed forces on a strategic plan for defense is on trial today before a bar of public debate.

I certainly do not question the right of any American to speak his honest opinion on the fitness of our plans. His is the nation to be defended and his are the taxes that pay the bills. And I respect the Constitutional right of Congress to make such provision as it may judge essential to the nation's safety. But as a soldier, entrusted by you with a share of responsibility for the nation's defense, I feel it my duty to speak the truth as I see it, to state my convictions as plainly as I can that you may know my position and that of the Army today.

Let me make it clear at the outset, that what I have to say is not in criticism of the Air Force. I work in daily close association with General Vandenberg of the Air Force and Admiral Denfeld of the Navy, and I know they both believe as strongly as I do that the security of the nation depends upon the teamwork of the services. It was General Vandenberg, himself, who said only two months ago: "The three services are in complete agreement that no one service can do the job alone."

Because too many Americans are searching for an easy and popular way to armed security through top-heavy trust in air power at the sacrifice of our remaining arms, we are in danger of reckoning our safety on fantasy rather than fact. I do not deprecate the vast capabilities of air power as a priority weapon for attack against any aggressor state. Nor do I deny that the threat of instant retaliation through an air offensive is our greatest deterrent to war today. But I

In a major statement of policy, General Bradley discusses the roles of strategic air power and the ground army in modern warfare, pointing out that security is a cooperative venture, not a competitive race

must part company with those enthusiasts who ascribe to air power limitless capabilities in winning an instant decision. Air power, like every other weapon, has gaping limitations for war as we shall know it for many years to come.

However crippling air attack can be, I am convinced beyond any reasonable doubt that should this nation be forced into still another conflict, we shall once more be forced to gain the inevitable victory over our dead bodies—those of our soldiers on the ground.

If I did not believe that war in the future will still thrust its eventual burden on the soldier who fights on ground, then I would readily recommend abolition of the Army and happily bequeath our missions to anyone who would have them.

To provide long-term security for the nation, our military requirements must be related both to American foreign policy and to the known offensive capabilities of likely enemy states. They must be predicated upon preparedness for a plan of war—a strategy that can defend our shores, aid our allies, and preserve a foothold from which to strike the aggressor in his homeland.

Even in the combined employment of air, naval, and ground arms, war presents a problem of priority and sequence in mounting an offensive against the aggressor's forces and the sources of his strength. To survive, the United States must be prepared instantly to gear its counterattack to a war of increasing violence, a war of growing intensity, and a war of widening global dimensions.

At the instant of aggression, the United States must fling the full force of its strategic air offensive against the enemy's heartland. But however savage this attack might be, it is dangerous for us to count on a decisive knockout in the first round. For the concentration of this initial air offensive must diminish as we dip deeper into the stockpile of our atomic bombs.

In the second stage of war, we must rapidly seize, hold, and push nearer the target those strategic bases from which we might bomb the enemy and from which he might bomb our cities. At the same time, while the enemy is flooding his neighboring states with troops and thundering against ground defenses, we must commit ourselves unreservedly to the preservation of a springboard for an eventual climactic ground attack.

If we were to accept the inevitability of enemy superiority on the ground, we should not only be forced to abandon our allies with frail hope of liberation, but we might also find ourselves trapped in a long and punishing war of attrition through air bombardment. While the odds in such a conflict would presumably lie with us, an air war of attrition could readily lead to disaster—to a duel, a duel in the best fabled tradition of the gingham dog and calico cat who ate each other up.

Unless the enemy suddenly were to collapse from the wounds of those first two blows, the United States must then be prepared in the third round of a war to strike at the enemy's forces, wrest from him his bases, and destroy the enemy's armies in large-scale ground assaults. Whether they be airborne or seaborne, these piercing attacks of mobile mechanized troops provide the only weapon that can find its way to the roots of enemy resistance and there crush it or subdue it.

Because the Army cannot subscribe to the thesis that air power is a self-sufficient power capable of single-handed victory in a global war, I am dismayed that those who dare question it should be tagged as ox-cart soldiers in an atomic age.

And I am alarmed that the Army's insistence on a combined defensive force should be distorted in the minds of some

Americans as stubborn opposition to the strengthening of air power.

The United States Army does not question the need for placing first emphasis on strategic air as the most formidable weapon of attack. We confirm the premise of most airmen that the fear of instant retaliation at the hands of our strategic air offensive is the most substantial deterrent to war today.

We freely affirm—in concert with the Joint Chiefs of Staff—our critical need for creating an instant war-readiness in American air power.

And we readily agree that while the nation in times of peace must curb exhorbitant spending for defense, first things must come first—and the first is readiness in air strength.

But this does not mean we can abandon the others of our armed resources. For if we are to construct air power at the fatal expense of ground and naval arms, then we may foolishly be forced to desert our allies and forsake our capacity to wage a sustained war.

By reckless reliance upon a knock-out blow in the opening months of a conflict, we might unwittingly risk defeat in war and the possible loss of our lives. Even a champion does not enter the ring until he has trained for the full bout.

If the Army and Navy were to be denied relative readiness in their striking forces to hold and seize advanced bases, we might easily waste our air strength in an over-extended and therefore far less effective preliminary air war. This could do nothing but lengthen the conflict and multiply its eventual cost.

By our failure to preserve a foothold for subsequent ground assault, we might have to abandon the promise of help for our allies and discard our hopes for decisive invasion against the enemies' armies.

For no alliance can be effective anywhere in the world until the United States is ready to deploy its strength immediately in the critical theater of war. And no massive invasion can succeed without a near and friendly base from which we might launch it.

Unless the Army can maintain a minimum mobile striking force as well as an effective base for mobilization of its civilian soldiers, the Army cannot be readied in time to accomplish its mission in war.

In our mounting sequence of attack against an enemy aggressor, we cannot ring a bell for the third round and have the Army answer: "Wait a couple of years and then we'll come out swinging!"

"Then" will be too late because of too little now.

The roles of defense forces are publicly defined during Congressional hearings on their budgets. But because limited peacetime budgets cannot and will not provide for the wartime mission of the Army, that mission is too often forgotten and frequently ignored.

Because air power is essentially a first-priority weapon, its first-priority needs are provided in peacetime readiness budgets.

And because the Army is a lesser-priority weapon in the sequence of attack, many of its peacetime needs are preparedness needs for wartime mobilization.

If we starve the Army in an effort to feed those first-priority forces, then we shall have to anticipate that ground support will be perilously thin in the initial stages of war and the large-scale ground offensive will, of necessity, be long-delayed.

Ultimately a war between nations is reduced to one man defending his land while another tries to invade it. Whatever the devastation in his cities and the disorder in his existence, man will not be conquered until you fight him for his life.

I repeat what I said before a committee of Congress: The Army will live scrupu-

lously within the means of a budget recommended to the Congress by its Commander in Chief.

It is clearly apparent that in the absence of any precipitant danger, the nation must curb within reason that share of the national income it would devote to its common defenses. A nation cannot hope to purchase within the limits of its purse an assurance of guaranteed security against aggression. But it can spread the risk among its several services so that with reasonable safety we may forewarn aggressors and intelligently provide for an effective force in the event of war.

This, I believe we have done—critically, soundly, and with the general approval of the services themselves.

The Department of National Defense is not irrevocably split—as critics would have you condemn it—among partisans of the several arms. We have made a start in compromising our individual requirements to construct—one with another—a security force that can best fulfill both our instant and eventual needs in the event of war. And we have learned that just as important as step-by-step sequence of fighting in modern war is the fundamental demand for complete unity in word and heart among the armed forces.

I pledge the willingness of the United States Army constantly to review its requirements that you need not be taxed for the maintenance of non-essentials. We do not exist to defend stubborn traditions, obsolete concepts, or yesterday's tactics. We exist to defend the nation, tomorrow as well as today.

And in subscribing to the need for prudence in military spending, I would much prefer to take some military risk rather than have to weather the dangers of an economic bust.

For only so long as we encourage the investment of our earnings in more production and better living for those who labor at our machines can we be assured that our massive industrial plant and the health of our people are equal to the challenge they face. And only so long can we sustain the faith of our allies, and aid them in the task of defending their reconstructed cities with some resources of their own.

The danger of conflict today appears to have slackened, partly because we are chewing sedatives in this constant war of nerves. What the coming years may bring will certainly be shadowed in the strength, resolution, and common sense of the United States.

If the three services pool specialized skills and means in the common mission of defense, it is logical to assume that the Army will have no business in the air or on the sea except for transit and such functions as artillery observation; the Air Force will have no need of an extensive ground and service organization, duplicating the Army; the Navy will not require major land forces and its air role against possible land objectives will be worked out to avoid unnecessary overlapping with the Air Force. Each professional component will be able to develop maximum effectiveness in its specialized field and all three combined in a single front, using common procurement and service as much as possible, will present the most efficient organization for armed defense.

General of the Army Dwight D. Eisenhower

The Raid on Dieppe

Colonel C. P. Stacey, Director, Historical Section,
General Staff, Canadian Army

This is the first of two articles on the Dieppe raid. In slightly abridged form, they comprise a part of Chapter IV and most of Chapter V of the volume, The Canadian Army 1939-1945, *by Colonel Stacey.* The second article will appear in the June issue of the MILITARY REVIEW.—The Editor.*

IN October 1941 Captain Lord Louis Mountbatten was appointed Adviser on Combined Operations, succeeding Admiral of the Fleet Lord Keyes who had held the title of Director. On 18 March 1942 Mountbatten became Chief of Combined Operations with the rank of Vice Admiral, and at the same time Combined Operations Headquarters was considerably expanded. This headquarters had two main functions: the organization of raiding operations to do immediate damage to the enemy, and the development of equipment and technique for amphibious operations generally and for the ultimate full-dress invasion of Northwest Europe in particular. It was with both in view that Combined Operations Headquarters originated the project of an attack on Dieppe. The raid on St. Nazaire took place on 28 March 1942; and in April planning began for that on Dieppe, a much larger enterprise.

This project had a far closer relation to the future invasion of the Continent than any raid yet attempted. It would illuminate what was considered in 1942 the primary problem of an invasion operation: that of the immediate acquisition of a major port. It was on a sufficient scale to afford a test of the new technique and material (including tank landing craft) which had been developed. Such a test was felt to be essential before attempting full-scale amphibious operations, for there had been no major assault landing since those at Gallipoli in 1915, and the small raids so far made had thrown no light on the handling of a large naval assault fleet in action.

The perilous enterprise was not undertaken without deep consideration. On 8 September 1942, reviewing the "hard, savage clash" at Dieppe in one of his periodical reports to the House of Commons, the Prime Minister of the United Kingdom said: "I, personally, regarded the Dieppe assault, to which I gave my sanction, as an indispensable preliminary to full-scale operations." Mr. Churchill had, in fact, at an advance stage of the planning, specifically sought the counsel of some

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Dieppe was one of the most hotly discussed, but least undersood, operations of the war. In this article, the Canadian Army historian tells of the objectives, plans, and the start of this bold venture

of his most senior service advisers on the utility of the proposed raid. The answer which he received, couched in the most decided terms, was that a raid on the French coast on a divisional scale was absolutely essential if the project of the ultimate invasion of France was to be seriously considered.

Dieppe, a resort town with a good harbor, lies some 67 miles from Newhaven in Sussex, just nicely within the range of the fighter aircraft of 1942. The coast hereabouts consists mainly of unscalable cliffs. The only really large gap in this barrier is at Dieppe itself, where there is nearly a mile of beach between the commanding headlands east and west of the town; but there is an accessible beach at Pourville, about 2½ miles west of Dieppe harbor, and a much narrower gap in the cliffs at Puys a little over a mile east of it. Another possible landing place is Quiberville, at the mouth of the River Saane, 8 miles west of Dieppe. Topography thus imposed severe limitations upon any plan of attack.

The Combined Operations Headquarters Planning Staff began work on an outline plan about the middle of April. The Army was represented by staff officers from General Headquarters Home Forces. At an early stage, the Commander in Chief Home Forces delegated his authority to the General Officer Commanding in Chief South Eastern Command, Lieutenant General B. L. Montgomery, who thereafter took the responsibility for the military side of the planning and himself attended some of the later meetings of the planners.

Documentary evidence on the development of the Outline Plan is fragmentary, but it appears that two alternatives were considered: one providing for no frontal attack on Dieppe itself, but based upon landings on the flanks at Puys, Pourville, and Quiberville; and the other comprehending a frontal attack, supplemented by flank attacks at Puys and Pourville, and by attacks by parachute and airborne troops on two coast defense batteries situated near Berneval, 5 miles east of Dieppe, and near Varengeville, 4 miles west. The latter plan was ultimately adopted, the planners recommending committing the tanks (which it was proposed to use for the first time in a Combined Operations raid) to a direct assault on Dieppe.

This frontal-attack scheme may have been related to the problem of immediate acquisition of a port, just referred to; an attempt to "pinch out" a port by landings on its flanks might lead to delays which would give the enemy time to demolish the harbor, whereas if the place could be seized by a blow into the center the problem would be solved. It was moreover considered preferable to land the tanks in front rather than to use the flank beach at Quiberville, because a tank attack directed from that distant point upon Dieppe, and upon the aerodrome of Dieppe-St. Aubin, directly south of the town, which was one of the main objectives, would have little chance of achieving surprise and would have to cross two rivers, the Saane and the Scie, whose bridges would require to be secured in advance. It was by no means certain, moreover, that these bridges would carry a Churchill tank.

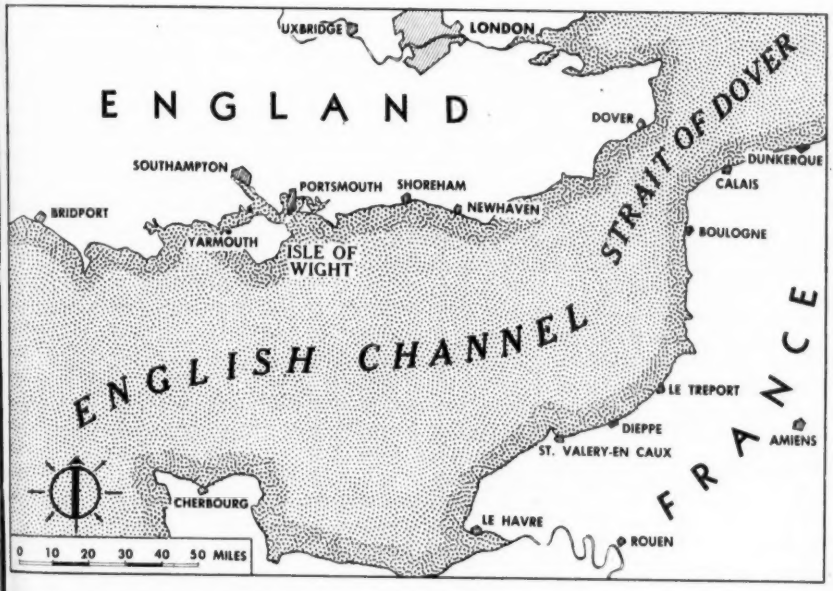
On 25 April, a formal meeting at Combined Operations Headquarters adopted the Outline Plan just sketched—incorporating a frontal assault preceded by air bombing. On 11 May, the Chief of Combined Operations submitted this Outline Plan to the Chiefs of Staff Committee, informing them that it had the concurrence of the General Officer Commanding in Chief South Eastern Command. In recommending the raid, Lord Louis Mountbatten wrote:

"Apart from the military objective given in the outline plan, this operation

will be of great value as training for Operation *Sledgehammer* or any other major operation as far as the actual assault is concerned. It will not, however, throw light on the maintenance problem over beaches."

On 13 May, the Chiefs of Staff approved the Outline Plan as a basis for detailed planning.

No Canadian officer had anything to do with the scheme until after the completion of the Outline Plan. On 30 April, General Montgomery visited General A. G. L. McNaughton at his headquarters and told him of the project. The troops were to come from South Eastern Command, and Montgomery said that while he had been "pressed to agree to a composite British-Canadian force, he had replied that it was essential to maintain unity of command, and that in his opinion the Canadian troops were those best suited. He had spoken of the operation to General H. D. G. Crerar, whose Corps was under his own operational command, and Crerar had recommended the 2nd Division for it. These arrangements General McNaughton, in his capacity as Senior Combatant Officer of the Canadian Army Overseas, now confirmed, subject to the plans being satisfactory and receiving his approval. From this time, accordingly, Canadian officers participated in the detailed planning.



The opening paragraphs of the Outline Plan ran as follows:

Object

I. Intelligence reports indicate that Dieppe is not heavily defended and that the beaches in the vicinity are suitable for landing infantry, and Armored Fighting Vehicles at some. It is also reported that there are 40 invasion barges in the harbor.

II. It is therefore proposed to carry out a raid with the following objectives:

(*a*) destroying enemy defenses in the vicinity of Dieppe;

(*b*) destroying the aerodrome installations at St. Aubin;

(c) destroying R.D.F. (radar) stations, power stations, dock and rail facilities and gasoline dumps in the vicinity;

(d) removing invasion barges for our own use;

(e) removal of secret documents from the divisional headquarters at Arques-la-Bataille;

(f) to capture prisoners.

Intention

III. A force of infantry, airborne troops and Armored Fighting Vehicles will land in the area of Dieppe to seize the town and vicinity. This area will be held during daylight while the tasks are carried out. The force will then re-embark.

IV. The operation will be supported by fighter aircraft and bomber action.

The opinion that Dieppe was "not heavily defended" requires comment. It was believed that the town was held by a single low-category battalion, though this was known to be supported by a considerable number of guns. This opinion was not in fact seriously at fault, for the force in the town itself on the day of the actual operation was only one battalion with attached troops (although the "Dieppe strongpoint" garrison as a whole, embracing also the Puys and Pourville areas, was two battalions). In the light of that day's events, however, it is difficult to avoid the conclusion that the planners underrated the influence of topography and of the defensive works known to be numerous in the target area.

The naval force employed was to comprise about six small destroyers, a shallow-draught gunboat, seven infantry landing ships, and a great number of small craft. The military forces were to be two infantry brigades with engineers, and "up to a battalion of Army tanks." The air forces were to include "sufficient bombers to produce extensive bombardment on selected areas and targets."

The plan provided for two infantry flank attacks, at Puys and Pourville, the force landing at the latter having the special task of capturing the aerodrome. Simultaneously with these attacks, parachute troops would be dropped to attack the German Divisional Headquarters and the coastal and antiaircraft batteries in the area. The possible use of glider-borne troops was also envisaged. Half an hour after the flank attacks, the frontal assault would be put in at Dieppe itself by up to two infantry battalions and up to 30 tanks. During the night preceding the raid, a heavy bombing attack was to be delivered against the dock area, ceasing not later than an hour and a half before the flank landings. In addition, Hurricanes would attack the beach area of the town immediately before the frontal assault. The original plan provided also for low-level bombing coming just before the Hurricane attack; but this was eliminated from the scheme on 15 May.

The Canadian military authorities could, if they chose, have rejected the Outline Plan and allowed some British formation to undertake the operation. Those who have followed the story thus far, however, will realize how loath any Canadian officer, in 1942, would have been to reject any plan, proposed by competent authority, which promised action; they will realize, too, how violently resentful the ordinary Canadian soldier would have been had an enterprise like the Dieppe raid been carried out at this time without the participation of the Canadian force which had waited so long for battle. A Canadian staff "appreciation" of the Outline Plan which is extant betrays initial doubts about the desirability of landing tanks on the Dieppe waterfront, but proceeds to adduce its possible advantages. Among these were the fact that, if successful, such action would place the tanks "in easy striking distance of the most appropriate objectives" (including the aerodrome); it would produce surprise; and it would have "a terrific moral effect" on both Germans and French. The plan was considered to have "a reasonable prospect of success," and the acceptance was recommended.

The same meeting of the Chiefs of Staff Committee which approved the Outline Plan agreed to the employment of Cana-

dian troops and appointed Military and Air Force Commanders: Major General J. H. Roberts, commanding the 2nd Canadian Division, and Air Vice Marshal T. L. Leigh-Mallory. The Naval Force Commander (appointed subsequently) was Rear Admiral H. T. Baillie-Grohman.

Training and Planning

The operation (known then as *Rutter*) entailed intensive combined training by the Canadian units. This was carried out on the Isle of Wight. The brigades designated were the 4th Infantry Brigade, commanded by Brigadier Sherwood Lett, and the 6th, commanded by Brigadier W. W. Southam. The tank unit chosen was the 14th Canadian Army Tank Regiment (Calgary Regiment), of the 1st Army Tank Brigade. The force also included large numbers of engineers, chiefly from the 2nd Division, artillery detachments to man captured guns, and the necessary medical and other units.

The syllabus was designed to "harden" the troops as well as train them. Training on a battalion basis having gone as far as it could be carried in the time available, a large-scale exercise, which was, in fact, a dress rehearsal for the raid, took place on 11-12 June near Bridport, Dorset, on a stretch of coast resembling the Dieppe area. The result was far from satisfactory; units were landed miles from the proper beaches, and the tank landing craft arrived over an hour late. In these circumstances, Lord Louis Mountbatten decided that further rehearsal was essential and that no attempt, therefore, would be made to carry out the operation during June, as had been the intention. The troops remained in the Isle of Wight, and the second exercise was carried out at Bridport on 22-24 June. The results were much more satisfactory.

It was now intended that the raid should take place on 4 July or one of the days following. The troops were accordingly embarked on 2 and 3 July, and thereafter remained "sealed" on board their ships. So far, only officers had known that an actual operation was to be undertaken; now, however, General Roberts and Admiral Mountbatten visited the various ships and spoke to the men on the tasks ahead of them. All the troops were fully "briefed."

On 3 July, the weather was unsuitable for launching the enterprise that night, and it was postponed for 24 hours. The next day, conditions still being unfavorable, it was again put off. On 5 July, a conference agreed upon modifications of plan with a view to carrying it out on a shorter time-table on 8 July, the last day on which tide conditions would permit it.

The concentration of shipping about the Isle of Wight had not escaped the notice of the enemy, and at 0615 on the morning of the 7th, four of his aircraft struck at vessels of the force lying in Yarmouth Roads near the west end of the Solent. Two leading ships were hit. Fortunately the bombs passed completely through the ships before exploding and the troops suffered only four minor casualties. This attack in itself was not enough to cause cancellation of the operation, for arrangements were hastily made to embark in another ship. The Naval decision, however, was that the weather was still too bad to permit attempting the operation on 8 July. It was accordingly cancelled; the bitterly disappointed soldiers were disembarked and the force which had spent so long in the Isle of Wight was returned to the mainland and dispersed. As the troops had been fully informed of the objective of the proposed raid, and once they left the ships it would no longer be possible to maintain complete secrecy, General Montgomery recommended that the operation should now "be off for all time."

During the weeks of training and re-

hearsing, the plan for the operation had been materially altered. In particular, the heavy bombing attack had been deleted. This was not done merely to avoid the inevitable casualties to the French population; for while normally it was the rule that targets in Occupied France could be bombed only when weather permitted a very high degree of accuracy, Mr. Churchill agreed on 30 May that coastal raids (only) might be an exception. On 5 June, however, a meeting attended by the three Force Commanders and presided over by the General Officer Commanding in Chief South Eastern Command accepted the recommendation of the Air Force Commander to eliminate the high-level bombardment. This was done for a number of reasons. It was thought that bombing, if not overpowering, might only serve to warn the enemy; the Air Force Commander was quite unable to guarantee the degree of accuracy which would insure the destruction of the row of houses facing the sea front; and in these conditions the Military Force Commander feared that destruction within the town would be such as to block the streets with debris and prevent the tanks from getting through to their objectives to the south.

The operation, abandoned on 8 July, was nevertheless revived about one week later. The Dieppe project had been an important element in the program looking towards a future invasion of the Continent, and its cancellation was a setback to that program as well as a disappointment to the Canadian troops. Apart from these considerations, there were obviously others which made a major raid expedient, at this moment. The public in the Allied countries, we have seen, was calling loudly for action, and considerations of morale suggested the desirability of meeting the demand as far as practicable. At the same time, the German successes in Russia rendered it essential to give any diversionary aid possible to our Soviet Allies. There is no evidence that the Russian situation was actually an important factor in the decision to revive the Dieppe project, but the news that a large distracting raid in the west was again in prospect was welcomed by the British Prime Minister, who shortly after the decision was taken found himself faced with the somewhat formidable task of informing Marshal Stalin that there was to be no second front in Europe in 1942.

For an early operation, the Dieppe scheme was the best possibility: it offered a ready-made plan and a force already trained. It was now subject, however, to serious objections on grounds of security, for the possibility had to be accepted that, with so many thousands of men in the secret, the enemy might have got wind of our plan. It could only be revived, therefore, if we could be more than reasonably certain that information of the revival would not reach the Germans. A satisfactory formula was found by Captain J. Hughes-Hallett, Naval Adviser at Combined Operations Headquarters.

With the military force ready trained as it was, he suggested, it was possible to re-mount the attack in a manner which would make it very difficult of detection in advance, for it was not necessary to concentrate the force beforehand. Instead, the various units could move direct from their stations to their different ports of embarkation, and embark there on the same evening on which they were to sail. Moreover, whereas for *Rutter* all units had been embarked in infantry landing ships with a view to transferring to small craft only in the vicinity of the objective, it was now suggested that three units might be carried all the way in personnel landing craft. This made further dispersion possible; Les Fusiliers Mont-Royal could embark at the small port of Shoreham in Sussex, and the Cameron Highlanders and No. 3 Commando at Newhaven. There would be no

Major General J. H. Roberts (on the right in the picture above), commanding general of the 2d Canadian Division, led the military forces which made the famous raid on Dieppe, 19 August 1942. As the Canadians approached the beaches (below), the alerted German defenders met the assault with heavy fire.—US Army photos.

noticeable assembly of shipping. The new basis proved acceptable to all parties; and Hughes-Hallett himself was now designated as Naval Force Commander.

Although in essentials the actual attack plan was the same as before, certain modifications were introduced. In particular, it was decided to eliminate the parachute element of the force, substituting Commando units, who would have the task of neutralizing the coastal batteries on either side of Dieppe, which if left alone would make it impossible for our ships to lie off the coast.

The chain of command was also different. For *Rutter*, the responsible military authority had been the General Officer Commanding in Chief South Eastern Command, and the General Officer Commanding in Chief First Canadian Army had held only an undefined watching brief. For *Jubilee*—the name by which the raid was now to be known—the Commander in Chief Home Forces, on General McNaughton's recommendation, made the Canadian Army Commander the responsible military authority. General McNaughton delegated this responsibility to General Crerar. General Montgomery thus ceased to have any further connection with the operation; and before it actually took place he had left for Egypt to assume command of the Eighth Army.

Before the plan was made "firm", there was further discussion of the question of aerial bombardment. The Air Force Commander again advised against it, and the Military Force Commander, for the same reasons already given, concurred. General Roberts wrote later:

> "The original plan for bombing envisaged two or three minor bombing raids on Dieppe, prior to the operation. As these had not been carried out, it was felt that a large-scale attack, probably inaccurately placed, would merely serve to place the enemy on the alert. This was a considerable factor.
>
> "At all stages it was insisted that bombing could only be carried out by night, and inaccuracy, rather than accuracy, was guaranteed."

The elimination of the air bombardment had removed from the plan the one element of really heavy support contained in it. The assault would now be backed by nothing stronger than 4-inch guns and Boston bombers. Surprise, rather than striking power, was to be the chief reliance in this operation. In the main attack, much would also depend upon the most exact coordination between the attack by cannon-firing fighters, the landing of the infantry, and the arrival of the first flight of tanks.

The utmost precautions were taken to maintain secrecy. Senior officers of the units were told of the revival of the project only a week or so before the operation; the men learned of it only after they arrived at the embarkation ports on 18 August. Those carried in landing ships were briefed on board; those crossing the Channel in small craft were briefed in specially-guarded buildings just before embarkation. The infantry units moved to the ports by motor transport the afternoon before the raid, the move being represented as a "movement exercise."

The total of ships and craft employed in the operation (including vessels of two minesweeping flotillas which cleared the way) was 253. The military force embarked amounted to approximately 6,100 all ranks, of whom 4,963 were Canadians and about 1,075 were British. In addition, there were some 50 all ranks from the 1st US Ranger Battalion (dispersed among various units as observers) and 18 all ranks of No. 10 (Inter-Allied) Commando.

About 2130 on 18 August, the first ships slipped out of Portsmouth and Southampton; and, as darkness fell, the various groups drew into formation and shaped their pre-arranged courses towards the French coast.

The Plan and the Crossing

The plan for the attack on Dieppe entailed assaults at five separate points. Four simultaneous flank attacks were to go in at 0450 British Summer Time. It was

intended that the craft would touch down while it was still dark enough to make it difficult for enemy gunners to see their targets. These attacks, from right to left, were as follows: upon the coastal battery near Varengeville by No. 4 Commando; at Pourville by the South Saskatchewan Regiment; at Puys by the Royal Regiment of Canada; and upon the battery near Berneval by No. 3 Commando. Half an hour later, the main attack was to go in at Dieppe itself, delivered on the right by the Royal Hamilton Light Infantry, and on the left by the Essex Scottish. Here, the leading tanks of the 14th Canadian Army Tank Regiment were to land simultaneously with the first wave of infantry. The Military Force Commander had available as "floating reserve" one infantry battalion, Les Fusiliers Mont-Royal, and the Royal Marine "A" Commando.

Half an hour after the initial assault at Pourville, the Queen's Own Cameron Highlanders of Canada were to land there and push inland to join up with the tanks moving southward from Dieppe and deliver a joint attack against the aerodrome. Speaking broadly, the scheme of the operation was to capture Dieppe and establish around it a perimeter within which extensive demolitions would be carried out by the Engineers. Outside the perimeter the Camerons and the tanks would operate against the aerodrome and the German Division Headquarters, which was mistakenly believed to be located in Arques-la-Bataille, some 4 miles southeast of Dieppe. We now know that it had moved on 27 April to Envermeu, 6 miles farther east.

Command was organized as follows. Capt. Hughes-Hallett was in the headquarters ship, the destroyer *Calpe;* with him was General Roberts. Air Vice Marshal Leigh-Mallory was at Headquarters No. 11 Fighter Group, at Uxbridge, Middlesex, which was the best point for controlling his squadrons; he was represented on the *Calpe* by a senior RAF officer. To provide against destruction or disablement of *Calpe,* a duplicate headquarters was provided in the destroyer *Fernie*; the senior military officer here was Brigadier C. C. Mann, who had played a leading part in the Canadian staff work for the operation. Admiral Mountbatten and General Crerar were to "watch" from Uxbridge, for once the operation had begun it could be materially influenced only by air intervention.

Throughout the night the flotillas, shrouded in darkness and maintaining wireless silence, sailed towards their objective. The force passed in safety an enemy mine field, through which passages had been duly swept and marked. All went well until 0347, but then misfortune struck. At 2000, we learn from Field Marshal von Rundstedt's report, a small German coastal convoy, consisting of five motor or motor sailing vessels escorted by three submarine-chasers, had cleared Boulogne harbor for Dieppe. This convoy now ran into the extreme leftward group of our force, "Group 5," consisting of 23 personnel landing craft, accompanied by three small escort craft and carrying No. 3 Commando. Two destroyers were covering our eastward flank, but these ships were not in close company with No. 3 Commando's craft, and, in fact, took no part in the action which now ensued; their commander believed that the gunfire came from the shore. It is interesting to note that the movements of the convoy had been detected by shore radar stations in England, and two warning signals were sent out by the Commander in Chief, Portsmouth (at 0127 and 0244). Some vessels of our force received them; others evidently did not, and among those which did not, it appears, were these destroyers. The result was that the British escort vessels fought a violent short-range battle with the Germans, and were seriously

damaged. The craft carrying the Commando were completely scattered. One of the enemy submarine-chasers was sunk.

In view of the danger of complete loss of surprise which this encounter represented, the question has sometimes been asked: Why was the operation not abandoned at this point? There were definite reasons.

The operation order specified, "If the operation is to be cancelled after the ships have sailed, the decision must be made before 0300." This was because this was the time fixed for the infantry landing ships concerned with the flank attacks to lower their landing craft, which would immediately start in towards the beaches. In order to avoid the landing ships' being detected by the German radar, it was necessary to lower the craft some 10 miles from the shore and allow almost 2 hours for the run-in. As no satisfactory means existed of recalling a large number of assault craft travelling in darkness, it was impossible to call off the operation at the time of the encounter with the convoy, nearly an hour after the deadline fixed in the order.

The planners, it is of special interest to note, had striven to provide against precisely the sort of eventuality which had now taken place. The naval orders directed that wireless silence might be broken "by Senior Officer of Group 5 if by delays or casualties it is the opinion of the senior military officer that the success of the landing at 'Yellow' beach is seriously jeopardized." But the Group Commander was quite unable to report his misfortune, for in the fight with the German vessels the wireless installations on his steam gunboat were destroyed, and wireless traffic congestion foiled a subsequent attempt to signal from a motor launch. The consequence was that the Force Commanders in *Calpe*, although sight and sound had advised them that there had been some contact with the enemy, received no actual account of the events until about 0600, when both the flank attacks and the frontal attack had gone in. The whole episode was a remarkable example of how, in war, the most careful calculations may be upset.

The Enemy at Dieppe

German documents now in Allied hands afford a very detailed picture of the enemy's strength and dispositions in the Dieppe area.

The highest German military authority in France was the Commander in Chief West, Field Marshal von Rundstedt. Dieppe was in the sector controlled, under him, by the Fifteenth Army. The Corps concerned with it was the 81st, with headquarters near Rouen; and the Division directly responsible for the Dieppe area was the 302nd Infantry Division. This Division was not regarded as of particularly high quality; it had a certain number of foreigners in its ranks, and its transport was horse-drawn. Its heavy weapons were largely of foreign type—Czech, French, or Belgian; but for this very reason it has been possible to equip it on an unusually lavish scale.

The Dieppe area was organized as an independent strongpoint capable of "all-round defense" and girded on the land side with a continuous barbed-wire obstacle. The strongpoint area included Puys and the high ground immediately east of Pourville. The latter village itself lay outside the wire, but the troops holding it were clearly considered part of the strongpoint garrison. The garrison was controlled by the headquarters of the 571st Infantry Regiment, located on the West Headland at Dieppe. It consisted of two battalions of this regiment (with headquarters on the West and East Headlands respectively); a battalion of the 302nd Division Artillery, with four four-gun batteries; the headquarters of the division engineer battalion with two of its

companies; and various minor units, including *Luftwaffe* antiaircraft artillery in considerable strength. The remaining battalion of the 571st Infantry Regiment was in Ouville-la-Rivière, southwest of Dieppe, and outside the strongpoint, as regimental reserve.

The sector was very strong in artillery. The sixteen 10-cm field howitzers of the division artillery battalion were in four battery positions, two on each side of Dieppe and all but one within the wire barrier. In addition, eight French 75-mm guns were emplaced on the front of attack to sweep the beaches. There were 30 antiaircraft guns, including six heavy ones, in the area of battle. Finally, there were three coastal batteries in the sector attacked: that at Varengeville with six 15-cm (5.9-inch) guns, that at Berneval with three 17-cm and four 105-mm guns, and one near Arques-la-Bataille with four 15-cm howitzers. A fourth battery at Mesnil Val, west of Le Tréport, mounting four 15-cm guns, was close enough to intervene effectively in the Berneval area.

The enemy had large reserves. The 302nd Division's own reserve consisted of an infantry regiment with two battalions under command and headquarters at Eu, near Le Tréport. The Corps reserve was another regiment with its headquarters at Doudeville, south of St. Valery-en-Caux, plus a tank company at Yvetot. In Army reserve, there were four rifle battalions northwest of Rouen and some motorized and self-propelled artillery. A still more formidable factor was the 10th Panzer Division, forming part of Rundstedt's Army Group reserves. This division, we knew, was in the Amiens area and would certainly be thrown in against any large-scale landing. We counted upon completing our operation before it could get into action.

Our troops who returned to England after the raid were in general convinced that the enemy had known in advance that it was going to take place and had strengthened Dieppe accordingly. Those who became prisoners were even more strongly of this opinion, having been told by the Germans that they had been "waiting for us" for days past. Today, however, with all the enemy's records at our disposal, we can say with complete certainty that he had no fore-knowledge whatever of our operation.

The Germans' solid information was limited to the knowledge that during the summer landing craft in considerable numbers had been assembled on the English south coast; and this, coupled with their general estimate of the strategic situation, led them to intensify their defensive measures along their whole front, including of course the Dieppe area.

Special precautions were prescribed by the Germans for periods when moon and tide were particularly favorable for landings. On 20 July the Fifteenth Army issued an order calling attention to three such periods: 27 July-3 August, 10-19 August, and 25 August-1 September. On 8 August, accordingly, the headquarters of the 302nd Division ordered a state of "threatening danger" for the 10 nights from 10-11 to 19-20 August. The enemy coastal garrisons were thus under a special alert at the moment of the raid.

In the Germans' eyes, the situation in Russia provided a special reason for precautions on the Channel coast. On 10 August, at the outset of the period of alert just mentioned, the Fifteenth Army sent out an order beginning, "Various reports permit the assumption that, because of the miserable position of the Russians, the Anglo-Americans will be forced to undertake something in the measurable future"; his troops were warned that such an attack would be a grim business and were urged to do their duty. A month earlier, on 10 July, Headquarters 81st Corps had told the 302nd Division that the Commander in Chief West had ordered

precautions because of the Russians' reverses and the fact that they were believed to be "again" demanding of the British government the establishment of a second front. It added that there was no information of actual preparations for an attack, but that the Division was nevertheless to be brought up to full strength forthwith. This decision had considerable effect before the raid. The 302nd received two drafts of untrained reinforcements (1,353 and 1,150 men) on 20 July and 10-12 August respectively and its establishment was full on 19 August. Other divisions on the coast were similarly reinforced.

How far did the collision with the German convoy serve to put the enemy on shore on the alert and thereby contribute to the defeat of our enterprise? Even today, this is not a simple question to answer. Certain German reports state categorically that the effect was decisive. Thus, that of the 81st Corps says that as a result of the engagement "the entire coast defense system was alerted." There is a similar remark in the report of the Commander in Chief West. Yet detailed analysis of the German documents, and collation of them with our own information, do not wholly support these statements.

The noise of the fight at sea did cause immediate precautions at some places. In particular, the *Luftwaffe* men staffing the radar equipment at Berneval manned their strongpoint within 10 minutes of the fight beginning; from that moment the attack intended for that place had little chance of succeeding. We do not know when the defenses were manned at Puys; but we do know that at Pourville our first wave of infantry landed without a shot being fired at them. We know also, from the report of the 302nd Division, that the 571st Infantry Regiment in Dieppe itself did not actually order "action stations" until exactly 0500 when it had already heard of the landing at Pourville a few minutes before. The Division ordered "action stations" one minute later. Notable also is the fact that about an hour after the contact with the convoy at 0445, the Commander Naval Group West expressed to General Headquarters West the opinion that the affair was only a "customary attack on convoy." It would seem that the convoy escort had made no report of landing craft. The conclusion to which we are forced is that the convoy fight did *not* result in a general loss of the element of surprise; and while it diminished our chances of success in the eastern sector off which the encounter took place, it is questionable whether it affected the main operation one way or the other.

I believe that when this war is examined in proper perspective it will be seen that the sobering influence of the Dieppe operation on existing Allied strategical conceptions . . . was a Canadian contribution of the greatest significance to final victory.

General H. D. G. Crerar, Canada

Radiological Defense*

Lieutenant Colonel Melvin F. Eyerman, *Medical Corps*
Instructor, Command and General Staff College

IN the 3 years since the detonation of the atomic bomb over Hiroshima on 6 August 1945, all peoples have had varying opinions as to what the future might reveal. During this period, we have seen a world lulled to a false sense of security and a growing acquiescence to accept the status quo as time heals and dulls our memories of the devastation visited upon the selected cities of Japan. Today the moving events of current history draw our attention away from the catastrophe which the atomic bomb caused, and which it can all too easily produce again.

The Military Establishment, however, has not been turned from its study of this the newest and most powerful weapon of warfare. Almost continuously tests are being prepared or conducted to determine the most advantageous use of this power, how to control it, and how to counteract or protect our forces should such a bomb be employed against us.

Nuclear Phenomena

To present a study in nuclear physics is not the purpose of this article. It is sufficient to state that physicists in 1939 determined that when the nucleus of the uranium atom was bombarded with a particle named the neutron it fissioned into two almost equal new atomic nuclei and liberated enormous quantities of energy in so doing. One should realize that the disruption of the nucleus of an atom opened an entirely unexplored field of science, and much of the expectancy which exists in the minds of laymen today concerning atomic energy is the result of a constantly growing knowledge upon the part of everyone, scientist and non-scientist alike.

The fission of the uranium nucleus, with its attendant energy liberation, set many scientists pondering on the possibility of constructing a uranium bomb and the utilization of subatomic energy in warfare. Today we know that the efforts of the Manhattan Project achieved this, and that the bomb was successfully employed against one of our enemies.

Nuclear Radiations

It was recognized early in the experiments with nuclear fission that certain radiations and particles were born out of fission along with the basic energy changes. It was further shown that these

* The term "radiological safety," hitherto applied to this subject, has now been changed to "radiological defense." See the foreword to *Radiological Defense*, Vol. 1, 22 January 1948.

"Operations in the face of radiation are a calculated risk, but in everyday life tests just as crucial are encountered, although almost unnoticed because they are not highlighted by a sense of the unknown"

radiations and particles caused tissue damage to any animal life exposed to them. Let us first consider the radiations and later the particles accompanying the detonation of an atomic bomb.

Instantaneously with an atomic bomb detonation, an astonishingly large amount of gamma radiation takes place. Gamma radiation is the same as X-ray radiation except that it will travel farther and penetrate more deeply. When gamma radiation passes through living tissue, it destroys the cells of the tissue by the electrical change, or "ionization," which occurs. Certain tissues in the body are more sensitive to ionizing radiations than others. We find that sensitivity of tissue decreases in this order: blood-forming tissue, digestive track tissue, gonads, skin, bone, and nervous tissue.

Persons subjected to the gamma radiations produced by an atomic bomb explosion develop symptoms or signs of sickness known as "radiation sickness," which may be transitory in effect or may be severe enough to cause death. The more extensive the surface area exposed to the gamma radiation, the more severe will be the effects produced.

Radiation Sickness

Let us follow the course of acute radiation sickness in a person who may have been standing in the open at the time of a bomb explosion. Within a few hours after exposure, the subject develops nausea and vomiting. Many investigators attributed these symptoms to a psychic background, in that the subject expected to become sick and therefore did. We know, however, that animals exposed to ionizing radiations also develop these signs, and yet they do not "know" they have been exposed to radiation. It is now accepted that early occurrences of nausea and vomiting signifies severe exposure to radiation.

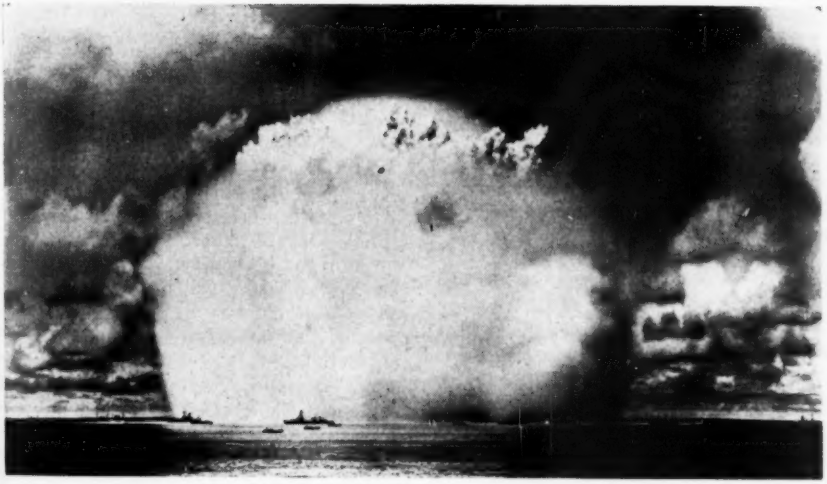
Certain changes also occur relative to the circulatory system, but these are quite transitory.

After these initial changes, the subject may go about his business without any symptoms. Normal occupation may be resumed and conducted as usual for variable lengths of time, from a few days to several weeks. The appearance of secondary acute radiation sickness will then begin. In this stage, the most characteristic changes are noted in the blood cells. It has been proved that radiation has destroyed the blood cell formation centers, and as no new cells are being formed the body suffers changes caused by this lack of sufficient numbers of cells. Degeneration of tissue is demonstrated by the formation of ulcerations on the gums and mouth surfaces. Infection is prone to occur widely throughout the body. Alopecia (falling of the hair) also occurs, and near death there is an abrupt rise of temperature.

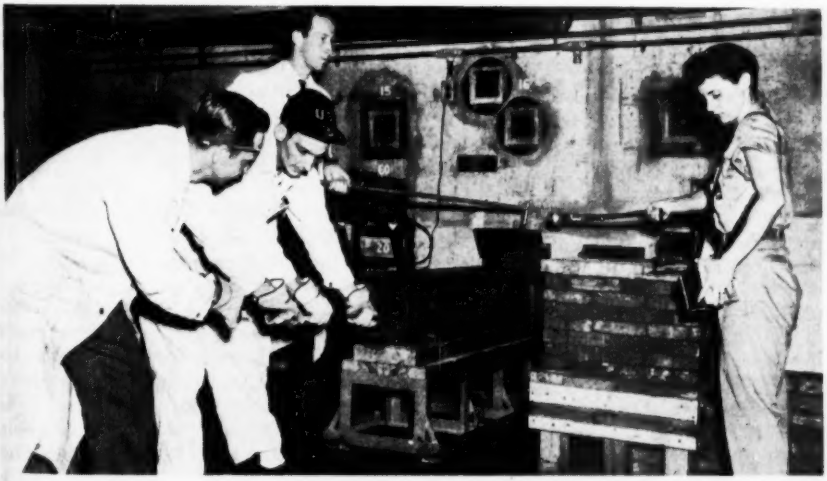
Not all persons showing even severe signs of radiation sickness are doomed to die. There is no way, presently known, to differentiate between persons who have received fatal amounts of exposure and those who have been subjected to less-than-fatal exposures. As symptoms begin to develop, therapy is started to supply blood cells (whole blood transfusions) in an effort to furnish the cells required until formation centers again become functional. To combat infection, penicillin or sulfa drugs may be administered. Vitamins and nutritious diets are also employed to assist the patient.

Other Radiations

At the same time that the gamma radiations are liberated, comparable amounts of ultraviolet and infrared radiations appear. These, and the gamma radiations, spread outward from their source with the speed of light and strike objects within their ranges within a few millionths of a second. The ultraviolet radiation is the



The discovery of the atomic bomb has given great emphasis to the importance of radiological defense. Above, the second bomb test at Bikini, 24 July 1946. Below, laboratory workers test the radioactive strength of material which has been removed from an atomic pile after a period of neutron bombardment.—US Army photos.



same ultraviolet radiation found in sunlight, which produces sunburn. A difference from sunlight exists, however, in that the atmosphere filters out the most harmful ultraviolet radiations of the sun, whereas in an atomic explosion no filtering occurs. The burns produced can be severe enough to kill. Any light material will give adequate protection against ultraviolet light. Even the protection afforded by a light colored suit saved many Hiroshima citizens, and the ordinary homes were ample protection against the ultraviolet radiations.

Infrared radiation carries off most of the heat developed by the bomb. It has been estimated that from 20 to 30 percent of the Hiroshima casualties were due to flash burns, and it must be assumed that the infrared radiation produced most of these burns. It has been estimated that at 2,000 feet the skin of many casualties was heated to 2,000 degrees centigrade. Clothing was set afire at 6,000 feet and telephone poles were scorched as far away as 10,000 feet. The infrared, like the ultraviolet, has no penetrating power and lightweight shielding gives protection.

Many casualties near the site of an atomic bomb burst will suffer from these three damaging radiations: gamma, ultraviolet, and infrared.

Blast

So far, consideration has been given only to radiation effects. In both the Hiroshima and Nagasaki explosions, more than half the casualties were produced by the blast effects, primary and secondary. It must be remembered that this bomb was designed primarily to exploit its destructive power and the blast that was generated has well satisfied its designers.

The blast pressure produced, and some of the blast effects, are still classified information and cannot be included here. Suffice it to say that the blast effect was reported by President Truman as being equivalent to that of 20,000 tons of TNT. It knocked down buildings up to a distance of 2 miles or more and destroyed 4 square miles of urban areas.

Residual Contamination

Soon after an atomic bomb is detonated, the "fireball" rises skyward and the instantaneous effects are passed. The explosion has, however, scattered radioactive materials over wide areas. These materials may be fragments of radioactive uranium or plutonium, from which the bomb was made, which did not fission. They also may be radioactive particles produced by the fissioning of the uranium or plutonium atoms into smaller atoms. These are called "fission fragments." Any of these particles which are radioactive are potentially dangerous and may cause harmful or fatal effects on persons in the area.

Radioactivity, referred to above, is that phenomenon exhibited by unstable atomic nuclei which spontaneously emit particles, or decay to a stable form. These particles are called alpha or beta particles from their characteristic electrical reactions, first noted by early investigators. In a magnetic field, these emissions were noted to deviate toward the negative pole, indicating positive charge (alpha), or toward the positive magnetic pole, indicating negative charge (beta). Both particles cause ionization in tissue and are therefore damaging.

Should a person be in or go into a recently bombed area, his body will be exposed to the action of these radioactive materials. Damage can occur through inhalation of dust carrying the particles, by ingestion effected by carrying contamination to the mouth, or by direct absorption through wounds. Although the range or distance through which the particles travel is extremely short, once they have entered the body they can damage cells within their range. Such internally active radioactive materials are termed "internal emitters."

A second characteristic of these particles is that they disappear or decay at fixed rates. This is called their "half-life." Half-life is the time required for any given amount of radioactivity to decay to half its initial value.

For example, the half-life of plutonium, one of the bomb materials, is 25,000 years; ingestion of even minute amounts of plutonium, therefore, will cause its effects to be present over the entire life span of the subject. This produces chronic or continuing damage to the area in which the plutonium is deposited.

Unfortunately for human welfare, most internal emitters have a predilection to deposit in bone tissue. As the red-bone tissue is the center of blood cell formation, chronic blood changes follow absorption of such emitters. Delayed results may also take the form of bone malignancies.

Detection

Man does not possess any sense or senses which can detect the nuclear radiations we have discussed. Even in fields of high radiation intensities, no warning is received even though widespread irreparable tissue damage is occurring. One must, therefore, rely upon the proper use of suitably constructed instruments. These instruments operate because of the electrical changes produced by ionization of gases when they are subjected to radiation. Presently, the Chemical Corps is testing several instruments for reliability of response and durability under field conditions.

A small instrument now available is about the size of a fountain pen and is worn clipped into the pocket. In fields of radiation, this instrument loses an electrical charge, previously applied to it, in proportion to the ionization formed within it by the radiation. The interpretation of this charge loss indicates the amount of radiation to which the instrument and its bearer has been exposed. A valuable feature of these "pocket dosimeters" is that they integrate repeated exposures and thus indicate the accumulated total amount received, at any time.

A second detecting devise is the "film-badge." It is known that when photographic emulsions are exposed to radiations, latent images are produced which can be made visible by development. In the developing solutions, the latent image is converted into a black deposit of metallic silver. The amount of blackening is a function of the amount of exposure and the conditions of development.

The blackness of the processed film is usually measured with a densitometer and the reading of the densitometer correlated to standard readings obtained from films exposed to known intensities of radiation. This measures the amount of exposure to which the film has been subjected.

The film described is packed in light-proof paper and placed in a suitable carrier or badge which can be clipped or pinned upon the clothing. It then furnishes a record of the exposure which the bearer encounters. An especially important feature of this device it that it produces a permanent record.

The pocket dosimeter and the film badge are used as detecting devices when worn by individuals. For detection of radiation in an area, portable survey instruments have been designed. The Portable Radiation Survey Meter and the G-M Radiation Survey Meter are two popular devices used for this purpose. Each registers the ion current formed within their probes when a radiation field is encountered. By applying the current strength reading to appropriate calibrated charts, the amount of radiation responsible for production of the current is obtained. As noted, these instruments are employed to survey large areas where radiation may exist and to determine the actual location and intensity of such radiation. Notices

can accordingly be posted, displayed, or published to warn persons of an existing danger which can not otherwise be sensed.

Protection

It is accepted, today, that any area subjected to atomic bombing may have to be reentered and reused, depending on the military or economic situation. Detection then becomes extremely important. We feel that up to 20,000 persons at Hiroshima unnecessarily lost their lives because rescuers could not detect radiation and failed to reenter the cities.

Persons may have to reenter a contaminated area to fight fire, rescue casualties, and save property. Such operations are performed with the acceptance of a certain amount of calculated risk. There is no tolerance to radioactivity—it is all damaging—but with proper monitoring devices, personnel or area-survey type work can and must proceed until the workers receive the calculated-risk level of radiation beyond which they would become casualties.

Persons working in areas where contamination through contact may occur have available the following added protection:

Masks: "Chem-ox," assault, or specially designed masks to prevent inhalation of radioactive particles.

Protective clothing: Caps, glasses, gloves, coveralls, rubbers and socks, which can be carefully removed upon leaving the contaminated area and cleaned or destroyed to prevent spread of contamination.

Prescribed working areas: Survey teams scan the area and post the location of radiation hazards to be avoided.

Prescribed working time: Survey teams scan and determine radiation intensities present and post the maximum time-interval workers may remain in the area with safety.

Decontamination

Decontamination procedures remain classified and therefore will be omitted from this discussion. Generally, however, one must remember that the radioactivity will decay over a period of time. The rate of decay is fixed for each substance and, at present, cannot be altered by any known means. Certain radioactive materials decay rapidly, some in fractions of a second; others, as in the case of plutonium, in terms of thousands of years.

One realizes that contact contamination can and should be removed, in industry and atomic bomb experimentation; methods for removal, either partial or complete, have been established.

In an area, radioactive material must be isolated by denying access to the area, by erecting concrete or metal barriers which stop the radiations, or by burial.

Conclusion

Everyone, soldier or civilian, should be interested in this newest field of science and military art; it has been utilized in warfare and may probably be employed again.

In the instantaneous explosion of a bomb, anyone within the effective area may become a casualty. It is then we become "our brother's keeper" and must be prepared mentally and physically to re-enter a bombed area to render the assistance indicated. Operations in the face of radiation are a calculated risk, but in everyday life tests just as crucial are encountered, although almost unnoticed because they are not highlighted by a sense of the unknown.

Radiological defense presents real dangers and we must show considered respect for them. Likewise, we must know our position and not permit an unreasoning fear to prevent us from achieving our responsibilities.

'Putting the Personal Into Personnel'

Lieutenant General Willard S. Paul
Former Director of Personnel and Administration, Department of the Army

World-Wide Scope

CHANGING world situations, the desire of peoples at every level of society to be treated as human beings, economic necessities, and the basic tenets of an enduring democracy demand increased emphasis on scientific personnel management.

Effective personnel management is not something which mysteriously appears as a mushroom growth but rather it is the result of sound policy, careful personnel research, and the meticulous implementation of sound principles. Personnel management relies on certain techniques or skills that are basic and necessary, typical of which are a functional organization, efficient selection, skilled training, proper delegation of authority, effective controls, adequate coordination, and the *studied* use of incentives.

International pressures and world-wide responsibilities require a strong foundation on which to build the personnel practices of the Army. Our diminished strength from 10 million men to our present strength has not lessened personnel problems to any appreciable degree. The human element in any progressive organization requires constant intelligent attention so that our objectives will be reached. Skilled personnel managers are urgently needed at all echelons to accomplish our personnel management responsibilities.

Any organization as diversified and complex as the Army demands constant attention and improvement if it hopes to operate on an efficient basis. The most important single asset of such an organization is its people. If the Army is to meet its responsibilities to the country, we must operate on a sound personnel policy aimed at the efficient utilization of our people and implemented by progress in effective personnel management.

During World War II, we learned the hard way that our supply of qualified and trained personnel officers was critically short. Trained officers were not available in sufficient numbers to handle the personnel problems involved in a 10 million-man organization. Progress since the close of World War II has been most encouraging, even though much remains to be done.

Personnel Policy

We now have an announced personnel policy for the Army. This policy was published as Department of the Army Circular No. 121 on 30 April 1948. It is predicated on the premise that the *individual is the most important single asset in the*

The Army's personnel management program seeks to place the right man in the right job at the right time, while also assuring that he is developed professionally through progressive rotation of assignments

Army. This represents an effort to clarify and improve the daily working relationships between each individual and unit by fully recognizing the dignity and importance of the individual so that the Army may operate as an integrated team in the National Military Establishment.

Successful military leaders for many years, from the highest ranking general all the way down the ladder, have evolved their own individual personnel policies. The basic concept in all cases was almost identical, namely to "humanize" the management of people so that the mission would be accomplished more effectively. The Army personnel policy was published to unify, guide, and assure the widespread continuance of our basic objectives.

It must be clearly understood by leaders at all echelons that each man has a personality, each has individual problems, and that these people with their individual differences cannot and must not be treated by mass methods. All personnel must be treated individually as men and Americans.

Basic Objectives

Our aim is to evolve and implement a sound personnel management program consistent with the basic policy. The successful implementation of the Army's personnel policy at all levels requires the following:

1. Assuring the efficient utilization of each man's abilities.

2. Providing opportunities for each man to attain the highest proficiency of which he is capable.

3. Giving every reasonable aid to improve each man's welfare.

4. Planning wisely for the future so that any necessary expansion will use all available manpower effectively and with a minimum of disruption to the individual's economic life.

Daily progress is being made and each new idea which is considered for adoption is measured against the fundamental factors just enumerated. The gauge is: Will it work; will it improve our basic objective? Existing laws provide considerable authority, but as essential changes are suggested new legislation may be required to implement the basic ideas.

Commanders' Responsibilities

Like any fundamental document or plan, the personnel policy with its basic objectives requires that *all* commanders understand it, use it, and sell it. The success of the policy is closely connected with the commander's recognition of the importance of the individual as such in the Army.

Constant effort must be exerted to provide the individual with skilled leadership at every level in the command structure; to capitalize on his interests, aptitudes, and intelligence; to stimulate his initiative; and to impress the lessons of loyalty and patriotism. These aims require that we place the right man on the right job at the right time, and at the same time insure the individual's opportunities for professional development through intelligently planned and progressively rotated assignments.

This means a sincere effort to put the *personal* into *personnel.*

Human Relations

The Army offers an unlimited opportunity for research and development in the broad field of human relations. Other major fields of endeavor do exert a marked influence over the lives of members, but in most cases responsibility and control extend over only a small portion of the day. The Army's sphere of responsibility covering the lives of its members includes not only 24 hours of every day, but more important, it also includes every phase of that day including the serious responsibility of ordering men to accomplish missions in defense of their country at the risk of their lives. With these tremendous

responsibilities, the Army's challenge is not to follow suit but to take the lead in matters pertaining to human relations.

A survey was conducted recently to determine the reason why the Army was unable to maintain its authorized strength through voluntary enlistments. Among other findings, the survey indicated that the act of enlistment or re-enlistment was *an expression of attitude* on the part of the individual concerned, a problem clearly in the area of human relations. This was probably so since the span of control for civilian enterprises extends only through part of the day, whereas the Army's interest embraced the whole day, the working conditions, and every other facet of the soldier's life.

While the Director of Personnel and Administration has primary cognizance in the broad field of personnel research, responsibility for the execution of specific projects rests with The Adjutant General. The increased scope of postwar personnel research in the Army will include the careful investigation and development of methods and techniques involved in recruitment, selection, classification, placement, and morale, in order to utilize the individual most effectively in the military establishment. These fields require the scientific investigation of problems related to the evaluation, training, and effective utilization of individuals and groups in relation to work situations or occupations, plus effective personnel management. These broad categories presuppose the development of standardized instruments and techniques, the systematic gathering of relevant data, and the application of obtained results to individual and group problems—in other words, the broad field of human-relations study.

Subjects closely allied with human relations, such as leadership, personnel management, morale, welfare, career guidance, officers orientation, and character guidance clearly indicate the enormous scope of the problem. Obviously these broad fields have an effect on proper human relations. The Director of Personnel and Administration has been assigned the responsibility of correlating and implementing the policies and programs so that each is given its proper place in the over-all plan. Additional policy statements may be necessary from time to time. The Army's plan of action proposes to formulate a human-relations policy, to prescribe for the indoctrination of all personnel, and to conduct an exhaustive and continuous study in the field of human relations in the Army.

In the Army, two opposing groups of urges affect the minds of individuals. The first pertains to *what he wants to do.* The second pertains to *what he must do* for the good of the group or his mission. On many occasions what he *must* do is incompatible with what he *wants* to do. These opposing urges cause a state of mind which affects directly the morale of the individual and is finally reflected in the effectiveness of his leadership.

Psychological research has indicated that through adequate motivation by proper leadership an individual can be made to believe that what he must do is also what he wants to do. Stated more simply, this means that there can be a proper balance maintained between morale and mission. Effective leadership therefore acts as the catalyst which fuses two incompatible elements into a high state of morale.

It is obvious that not only our personnel policy, which describes the individual as the Army's greatest single asset, but *all* our policies must reflect good human relations. If the individual is our greatest asset, then by all means we should take care of him. All Army agencies have an interest in him. The G-1 has primary interest, but the G-2 keeps him informed as to his enemies, the G-3 trains him, and the G-4 looks after his material needs and furnishes tools for his use. When commanders and staffs throughout the

chain of command finally reach the point that all orders, directives, and policies are reviewed from a human-relation angle before implementation, then our difficult problems in this field will largely be solved.

It is doubtful whether the Army will be able to compete successfully with civilian enterprises to the extent that it will maintain its current authorized strength entirely by a volunteer system. Furthermore, it is questionable that the Army's human-relations policy should have that goal in view. Service in defense of our country is a duty of every citizen. Possibly our objective should be to make life in the Army as much like civilian life as circumstances and the nature of our mission permit.

The job of soldiering, like any other job, has certain occupational requirements. When understood, these requirements are accepted by the individual at their face value. When not understood, or when obviously unnecessary, these requirements are resented by the individual. This resentment eventually finds expression in one form or another; verbal, as an AWOL case, or as a failure to reenlist. Our task, then, is three-fold. First, we must reduce the occupational requirements of the job of the individual to the essential minimum. Next, we must explain to the individual the necessity for the minimum essential requirements. And finally, we must keep our ear attuned to any real expression of resentment. This, in effect, means we must keep our finger on the pulse of morale. The effectiveness of our Army human-relations program will be measured in terms of morale.

The Personnel and Administration Division has prepared a basic plan for such a human-relations program. This plan is currently "in the mill." It offers what is believed to be a practical approach to the solution of the problem. The solution, as in all solutions, will depend ultimately upon the degree of the support rendered and the leadership displayed by commanders when the program is implemented.

Proposed Action

The implementing study of human relations in the Army is based on careful research, adequate indoctrination, and corrective action. Planned studies are being proposed in the following typical areas:

1. Continuous study of the effects of current and future policies and programs.
2. Continuous research of existent policies, procedures, and customs of the service from a human-relations viewpoint.
3. Continuous study of the results of civilian research in the human-relations field.
4. Continuous study of methods, practices and policies of other arms and services and of the arms and services of other countries.

Career Management Programs

The Army now has the groundwork for a comprehensive program of career management. It has been established for enlisted personnel, warrant officers, and commissioned officers. Essentially these career programs are the core of human relations and effective personnel management in the Army.

Fundamentally, our main mission in time of peace is *training*. Therefore, we must assure the maximum opportunity for each potential leader—commissioned and enlisted—so that he will acquire broad military knowledge through practical experience. An integrated career-management system must offer unlimited opportunity to every individual in uniform. These potential leaders, in time of emergency, can be advanced rapidly in accordance with a sound plan to positions of vastly expanded responsibility and authority. Systematic and progressive training for each qualified individual must be insured so that the man will acquire a well-rounded

professional education within the broad field for which he is best qualified. A rounded experience does not preclude specialization but rather augments the possibilities of broader application and the more intelligent use of technical skills within a given, broad field.

To plan careers, we must evaluate the individual's desires and capabilities; we must insure his progressive advancement to the highest level for which he is qualified; his assignments must be based on his capacities, qualifications, and the need for his aptitudes in a particular assignment. Professional schooling, practical training, the preferences of the individual, and the needs of the service are integral parts of any career program. Career patterns have been established as a guide only and should be used accordingly.

Career Guidance Programs

The Career Guidance Program for enlisted men and warrant officers, which was in preparation for two years, was implemented on 1 August 1948. It provides many attractive features that should appeal to the individual who wants to follow an Army career. Systematic assignments, training, and advancement for each qualified person will assure competent personnel a well-rounded, professional education within the broad job field or fields. This system will provide the Army with an adequate cadre of trained leaders who have acquired by self-study, service schooling, and practical experience the necessary knowledge for their current or potential duties.

Three principal elements provide the basis for the career program:

1. The identification of essential jobs for the Army to accomplish its mission, plus the necessary standards and requirements for such jobs. The determination of job structure is based on 2 years of a research problem covering an extensive and elaborate job-analysis program. This program is based on field analysis of enlisted and warrant officer jobs by teams of trained officers, civilians, and enlisted men. Field analysis teams visited some 50 major posts and bases in the Zone of the Interior, Alaska, and Europe, and have written job schedules for almost every military job performed by enlisted personnel and warrant officers. A similar study will be completed for officers' jobs at a later date.

2. A training system for qualifying men to fill these positions. The training aspect of the program assumes that recruit and refresher training in training divisions will continue. The basic philosophy underlying the career guidance program requires that each individual will be given continuous opportunity to qualify for advancement. Therefore, he must be trained so that he will be prepared for the job at the next higher level. Apprentice training is used to advance an individual after he has completed his basic training, since this complements the unit's operational functions. The unit commander must conduct apprentice training in a systematic manner within his unit, consistent with unit training and the normal operations. A self-study pamphlet for each military occupational specialty is provided in connection with apprentice training. Information concerning other self-study material is made available to the troops through the information and education program.

3. A system of personnel procedure to get the right man in the right job at the right time. This system involves classification. By this procedure each recruit is classified into an appropriate career field * based upon his skills, aptitudes and interests. A new enlisted qualifica-

* A career field is a grouping of related jobs in accordance with a carefully developed system. A coding number is assigned each job to identify it properly and to serve as a "shorthand" designation. Approximately 50 such "job families" have been developed. Men will be classified, trained, and promoted as they fit into these various job families.

tion record card is being designed in order that all essential information may be readily available. A new efficiency report has been developed for enlisted personnel also. It is planned that this report will be used as one of the factors in determining eligibility for promotion and for determining an individual's proficiency in a given grade.

The initial assignment of individuals will be to the appropriate level of specialist training in a unit, or to technical training for a military occupational specialty in a service school, in accordance with the individual's career field. These initial assignments, made by Training Divisions, are to unit destinations by career fields for which there are allocated vacancies, or to port personnel centers for overseas service under the same circumstances.

Promotion procedures for enlisted personnel are based upon several factors, namely: minimum service in grade, passing a performance test, pooling of vacancies in the upper grades, and a mandatory form of promotion in the lower grades.

Warrant Officer Program

Each of the 50 career fields or skill groupings, mentioned earlier, will be headed by warrant officers who have become highly qualified technicians in a particular occupational area. Present warrant officers now in the service are being absorbed into these fields and the warrant structure converted to this pattern.

The procurement program for regular warrant officers is now under way. Some appointments have been made. These applicants are being drawn from temporary officers, temporary warrant officers, and enlisted personnel in the first three grades.

We hope to establish, through appropriate legislation, four warrant officer grades on a permanent basis. The proposed pay of these four grades will correspond *approximately* to the pay of major, captain, 1st and 2nd lieutenants, respectively. When this legislation is passed, it is planned to absorb warrant officers now on duty and those to be appointed, in the four grades mentioned previously. Such factors as length of service, type, and efficiency of service performed will be used to establish the level at which a warrant officer will be integrated.

We plan to continue an annual appointment program for warrant officers, drawing applicants from the Regular Army enlisted personnel. Promotion procedures are now being developed. We visualize some form of time-in-grade promotion for the two lower grades and a selection process for the top two grades. This will compare favorably with the officers' promotion program.

Career Management for Officers

The objective of career management for officers is to provide each officer with sufficient military experience and background by means of assignment rotation, formal schooling, and on-the-job training, so that the officer will be able to fill positions in the Army for which he is best qualified. A highly competent officer corps qualified to serve the nation most effectively in the event of a future emergency is a vital necessity. Assignment patterns have been developed to integrate the qualifications and the desires of individual officers with the essential needs of the Army and the country.

The career program to be administered successfully needs the wholehearted cooperation of all officers in carrying out the planned rotation of assignments. This plan was evolved to produce well-rounded, practical, experienced, and versatile officers. It will eliminate repeated assignments to the same duty unless specialization is indicated and will substitute greater opportunities for capable officers to gain wider experience in broad command, staff, and technical duties.

Two principal problems constantly interfere with the desired implementation of this program from the Department of the Army level. They are those of meeting overseas requirements and stabilizing officers' assignment in the United States. Officers will continue to be shipped overseas in great numbers as long as the occupation mission of the Army continues. An equitable procedure must be followed for assignments to overseas commands. Officers are selected for overseas service from a roster which is maintained by each arm and service. Deferments for compassionate reasons and requirements for officers with specialized experience have necessitated certain deviations from an exact following of overseas rosters in terms of eligibility.

The stabilization of personnel assignments in the United States is directly related to the problem of meeting overseas requirements. Typical of numerous factors which complicate this problem are efficiency within the various commands, economy in shipping costs, and the morale of the individual in connection with limited housing and high living costs.

Effects of Expansion

Career management, as well as any other Army activity, must be adaptable to war as well as peace. If mobilization becomes necessary, assignments must be made on the basis of demonstrated abilities. The training period of the career officer has ended; he must perform in a superior manner in the face of many difficulties.

If mobilization were to occur now, the Army would have on hand the Officer Corps of World War II. The nucleus for expansion is greater than ever before, but can the Army inventory its resources quickly and assign officers directly to a mobilization assignment? We hope to be able to answer this question in the affirmative as our plans are implemented. A Qualification Records Plan has been formulated which envisions the recording of each officer's qualifications, skills, and specialties on a machine records punch card, including mobilization assignments. Assignment jurisdiction in the event of mobilization will be exercised as follows: the Career Management Group of the Personnel and Administration Division will inventory the qualifications of all officers on extended active duty, and will be responsible for the mobilization assignments of those officers as well as critical specialists from other sources. Army Commanders will be responsible for the inventory and mobilization assignment of Reserve Officers. The National Guard Bureau will be responsible for National Guard Officers.

Procurement of Military Personnel

One of our major problems is that of securing the number and quality of individuals required to fill the spaces allotted to the Army by Congress. This procurement problem pertains to individuals for all arms and services of the regular establishment and the civilian components; it pertains to males and females, skilled and unskilled, and trained and untrained.

The enactment of the 1948 Selective Service Act and the resulting expansion of the Army raises the problem of securing a large number of officers qualified to lead and train the new inductees.

The principal source of this officer leadership must be the Officer Reserve Corps and the National Guard. In order to secure voluntary applications from the Reserve officer for recall to active duty, the Army must offer these officers certain advantages, such as higher standard of living, suitable family quarters, stability of tours of duty, opportunity to increase their military knowledge through an educational program, opportunity for promotion, and eventual retirement under the Reserve Officers' Retirement Act.

Many Reserve officers, desiring a tour of active duty, are at present assigned

to branches in which they are surplus to the present needs of the Army. Consideration must be given to the retraining of these officers to fill positions in other branches in which they are needed.

Procurement of Medical Personnel

The shortage of trained professional personnel, particularly Medical Department personnel, is the most serious procurement problem facing the Army today. This scarcity is not only an armed forces problem, but it also faces the nation as a whole. Many civilian communities are attempting to lure young doctors into their areas through special inducements. This nation-wide shortage is caused in part by the lengthy training involved, the resulting expense, and the limited number of approved professional schools.

The armed forces and other governmental health services are at a disadvantage in competing for the services of this type of personnel for many reasons, the most important being the difference between what the government services can pay and the income which private practitioners can command. Other reasons frequently mentioned are the lack of adequate housing, inadequate provisions for additional professional training, an undue amount of administrative work, limited opportunity to practice medicine, and overseas duty.

Corrective action has been taken on many of these complaints and every effort is being made to make service in the Army as attractive as possible. Medical Department officers are being given additional opportunities to continue their professional education and training during their careers. Special courses are being offered in many civilian and military hospitals in a large number of medical specialties. A professional training program has been instituted which subsidizes the education of medical school graduates by allowing them to accept commissions in the Medical Reserve Corps. Through this program, they continue their intern and resident training in either civilian or military hospitals and repay one year of service for each year of training.

Public Law 365 authorizes the payment of an additional $100.00 a month to all doctors and dentists. This is a step toward equalizing the differences in civilian and service pay. This same law also authorizes the direct appointment of civilian doctors and dentists in the Regular Army in grades from first lieutenant through colonel, depending upon age and professional experience. Even with these inducements, there are 1,600 vacancies in the Regular Medical Corps and 400 vacancies in the Regular Dental Corps.

The Reserve Officers' Training Corps has been one of the best sources of officer procurement. One goal is to have a medical unit in every professional school. Beginning with the 1947-1948 school year, there were 43 units. During the remainder of the year, 39 new units were installed for a total of 82 units in operation at the start of the 1948-1949 academic year.

The training plans given previously represent the best solution to our problem at the present time and it is hoped that they will help to produce the quantity and quality of officers that the Army needs.

Should We Go Underground?

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AT 0530 on the morning of 16 July 1945, the first atomic bomb was detonated in the middle of a New Mexico desert. Before evening of that same day, the small group of nuclear physicists who had conducted most of the basic research realized that the results of their efforts had many far-reaching implications.

As a result of the explosion from that first atomic bomb and the knowledge obtained from those employed subsequently, it has become a realization of the entire world that the bomb is a strategic, rather than a tactical, weapon. To properly appraise this concept for utilization of the atomic bomb, two basic assumptions must be made:

1. That even though the technical details of the bomb are presently a closely guarded secret, the length of time which this secrecy can be retained by the United States is highly questionable.

2. That any existing defenses against the bomb at the present time are practically negligible.

In view of the few recognized defense measures which can be taken to minimize the devastating effects of atomic attacks against this country, many suggestions have been made. These range all the way from dispersing our population at a maximum density of 600 people per square mile to moving a major portion of our large industrial centers completely underground. Either of the two extremes is totally out of the question. A possible solution might be an economical compromise some place in between.

Realistic Approach

However, when we as a nation are faced with the possibility that atomic weapons may be used against us in a sudden, vicious attack, our plans must be realistic. Any atomic attacks by an aggressor against us would most certainly be directed at our steel industry, the backbone of our present economic structure; a large proportion of our oil refineries; the motor vehicle industry; and many other strategic industries, such as rubber, precision instrument, aircraft engine, and chemical production. It has been estimated that between 50 and 100 atomic bombs directed at our key industries, which are even more dangerously concentrated than our population, would literally paralyze most of our economic potential.

Further implications as to the destructiveness of atomic attacks may be realized by the fact that any bombs dropped on the Cuyuna and the Mesabi Ranges, which produce approximately 60 percent of the nation's iron ore, would leave the ore radioactive and consequently quite useless. The

Survival in any future war may depend on how well the industrial and storage facilities of the nation are protected from swift, powerful bombing. If we go underground, then the question is, "How much?"

destruction of the Sault Ste. Marie locks by either atomic or high explosives would mean that 80 to 90 percent of the Minnesota iron ore would be cut off from the blast furnaces, due to lack of adequate transportation.

So it is definitely within the realm of possibility that during the first few hours of an attack by an aggressor we would find a large percentage of our industry seriously damaged, as well as thousands of civilians killed and wounded. It would make little difference whether the attacker used conventional explosives, atomic bombs, radiological elements, huge concentrations of deadly chemicals, or a combination of all four. The targets would be essentially the same.

Having recently completed the second major war within the past quarter century, we know that our industrial production is the greatest single element which will insure our existence either in peace or in war. In World War II, it took us almost 2 years to reach peak production on many critical war items. How long would it take to reach production if 50 percent of our industrial facilities had to be rebuilt before we could start to attain this goal? Frankly, no one knows, but from past experience it would most probably require considerably longer than in World War II. Realizing this, can we as a nation afford to assume that never again will a few individuals, at the head of a police state, go berserk in their search for power?

When the Compton Commission on Universal Training made their report to the President in May 1947, one of their recommendations was as follows: "The development of new weapons will be of no value unless our scientific progress is matched by industrial readiness for the problems of war that may come without warning at supersonic speed. Weapons that were not in being and in possession of our troops when an aggressor struck would be worthless in inflicting swift retribution upon him or in preventing his approach to our shores. Because of the danger that production centers would be demolished in the first days of war, a start should be made toward decentralizing the most vital plants, and in some cases, toward building underground or otherwise adequately protected facilities. Critical war materials must be stockpiled now, which may be used in the future."

There can be no question about the terrific expense involved in the dispersion of our industrial centers or the construction of bomb-resistant production facilities. To provide a reasonable amount of security for our economic potential, we must thoroughly explore the possibilities of a combination of the two most important and available means, dispersion and underground protection. Neither of these, considered alone and without thorough planning, can present a satisfactory solution.

Expense

When considered in the light of expense, it would be prohibitive to place all of our important installations underground. Further, it would be far too costly, as well as impractical, to disperse our existing cities over large areas. To construct buildings with sufficient strength to counter the blast effect of atomic missiles for even a small fraction of our total requirements would be equally expensive and impractical.

It is readily apparent that we most certainly would not scuttle our Navy simply because an atomic bomb might sink one or more ships. Nor, by the same token, would we recommend that our Air Force be demobilized simply because airplanes are shot down or occasionally crash due to mechanical failure. Nor does the Army feel that their task is insurmountable simply because soldiers are killed in battle. In considering the capabilities of the atomic bomb, many experts have propounded the

theory that we, as a nation, are absolutely defenseless against its employment. And finally, there are those skeptics who say that the effects of the atomic bomb are so persistent that, even if you are underground, you will eventually become a casualty when you come to the surface. One authority has even gone so far as to assume a situation where an aggressor might detonate only two huge atomic bombs and thus make the United States uninhabitable. This is based upon the supposition that by directing the missiles at central California and northern Oregon, and taking advantage of steady prevailing winds blowing toward the east, an enemy could expect to accomplish his mission with reasonable success. The theory behind such employment of atomic energy is that the contaminated winds would carry the radioactive particles across the Continent. The aggressor, however, would have no assurance that these same elements would not have the same effect upon his own country. This is quite possible because the elements released during the Bikini test were detected approximately one week later on the west coast.

True, the problems presented in preparing a defense for the atomic warfare which may confront us in the future are many and complicated. The utilization of underground installations certainly seems to be an answer, in part, to our difficulty. Even if we consider the worst destructive capabilities above ground, there is certainly hope for an initial defense if we can conserve, either underground or by dispersion, sufficient men, equipment, and supplies to launch a successful counterattack.

The mere existence of the atomic bomb has made the study of underground installations a vital necessity. We must, therefore, begin now to provide for our industry. Within economic limits, the initial requirements for military supplies and equipment must be provided for a possible emergency. To furnish the basic necessities for the military and civilian population with respect to supply, hospitalization, transportation, and services in a future conflict, we must determine our requirements, prepare sound plans, and then carry them into effect.

More Powerful A-Bomb

It is theoretically possible, at least, to manufacture atomic bombs ten, one hundred, or even one thousand times more powerful than any which have been used so far. Let us consider how destructive a bomb would be if it were a thousand times more powerful than those used on Nagasaki and Hiroshima. To give a very rough estimate, such a bomb would be capable of:

1. Causing complete collapse of normal dwellings in a metropolitan area 10 square miles.

2. Damaging beyond repair all houses within an area 31 square miles.

3. Rendering uninhabitable all dwellings, in an area covering 71 square miles.

The above figures demonstrate the difficulty in planning structures to withstand the explosive effect of bombs or guided missiles utilizing atomic energy. Construction standards of either surface or subterranean installations must be proportionately increased to protect against the terrific blast effect. Hence, it is extremely questionable whether a considerable degree of safety can ever be incorporated into individual surface structures. Any defensive installation, either natural or man-made, must protect against the three-fold effects of atomic explosions: first, to withstand the blast which destroys structures by the extreme pressures produced; next, to resist the blow-torch effect and terrific heat to which all inflammable materials may be subjected; and finally, insulation from the radioactive particles which kill or seriously injure human beings.

German Experience

Although the atomic bomb has so many destructive capabilities that very few adequate defenses have been developed against it, so far the underground installation seems to be a partial solution. Although we know relatively little from our own experience about the various details of construction and operation of underground installations, a wealth of information can be obtained by inspecting the methods and techniques developed by the Germans. While the Germans never completed a substantial part of their underground program necessary for war production and storage, they had prepared plans by 1944 for placing a large portion of their manufacturing and depot facilities below the earth's surface.

The Germans had very extensive plans for placing their aircraft and synthetic oil industries underground. By the end of the war, they were utilizing underground facilities for the manufacture of aircraft, aircraft engines and accessories, optical and precision instruments, guns, tanks, motor vehicles, electrical equipment, ammunition, V-weapons, and guided missiles. There is no indication, however, that the Germans had made any extensive preparations for placing their heavy industry in similar structures.

The types of underground installations used by the Germans were many and varied. Generally, they attempted to adapt existing facilities to provide for their underground requirements by converting mines, caves, railroad tunnels, and highway tunnels. At a few locations, the Germans had started construction on completely new underground facilities. Generally, these consisted of (1) buildings placed underground with a bomb resistant covering, and (2) tunnels or galleries cut into the side of a hill. The first type involved building a reinforced concrete arch approximately 10 feet thick, with a span from 200 to 300 feet, over a strata of gravel or hardpan. Thus no forms were necessary to support the concrete while it was being poured. After the arch had set, the gravel was excavated to the required depth for construction of the necessary buildings. Structures up to eight stories in height were built of pre-cast concrete columns, beams, and floor slabs under the protective covering. The heating and ventilating systems for this type installation were much more elaborate than those used in converted structures. Finally the concrete arch was covered with several feet of soil and crops planted on top to complete the camouflage.

The second type of new construction was quite similar to methods used in this country for tunneling and gallery quarrying. The principal disadvantage in using this means of construction was that the costs very often were ten times as much as for a surface installation with equal floor space. Costs for this type varied widely depending upon composition of the soil, so the locations of sites were governed by the geology of the area.

German Costs

The Germans developed some interesting figures on the cost of their underground installations. Records indicate that for converting mines, caves, and existing tunnels, the cost varied between 11 and 15 cents per square foot, based on a pre-war rate of exchange of two and a half marks per dollar. For their underground plants, which had to be completely constructed without the use of existing facilities, the average cost varied between 10 and 12 dollars per square foot. For those installations excavated from extremely hard rock and requiring extensive ventilation systems, the cost sometimes ran as high as 35 to 40 dollars per square foot. The above figures may be compared roughly with an average cost of industrial buildings in Germany at the same time of from 30 to 60 cents per square foot.

By the end of the war, the Germans had not accurately developed any definite conclusions as to the thickness of overburden or cover required for protection against the different types and sizes of high explosive bombs. Reports indicate, however, that their first estimates were that reinforced concrete from 10 to 20 feet thick would provide sufficient protection. These estimates were later raised—to between 30 and 40 feet as larger and larger bombs were used. Finally, after the heavy bombing attacks during the later stages of World War II, their engineers concluded that only from 200 to 300 feet of solid rock cover was sufficient to provide adequate protection.

One extremely important and vital lesson should be learned from the German experience. That is, to embark upon a program of "too little and too late" is worse than no program at all. In their final frantic rush for protection from aerial bombing, they used many of their critical materials required elsewhere for the war effort to construct installations which were of extremely questionable value. Faced with a scarcity of strategic materials, in the midst of a major war, it was hardly an appropriate time to rearrange the nation's production and storage program.

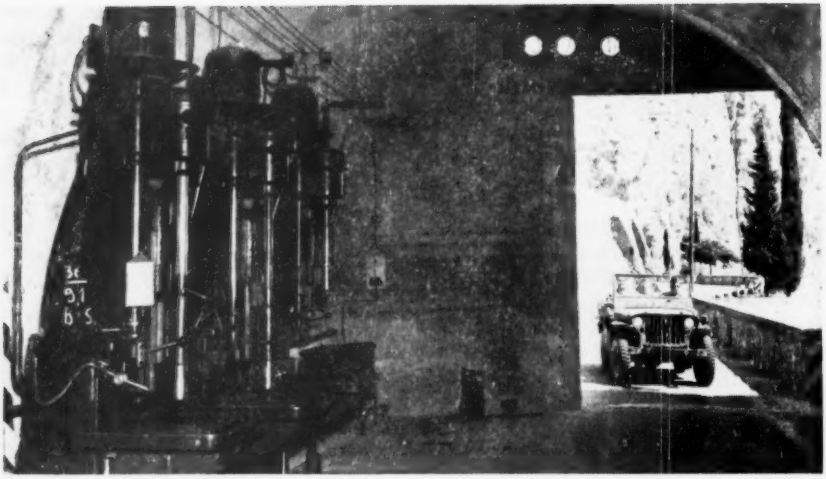
Types of Installations

Now let us consider the most elementary type of underground installation. This type consists of pits dug a few feet into the ground. The items to be stored are waterproofed, stacked in the pits, and the excavation covered with earth. The overburden is then topped with a bituminous material to make the storage space relatively waterproof. Several such underground storages have already been used by our Ordnance Department for the storage of bombs in place of conventional igloos. The advantage in using such a means of storage is that it provides one type of covered storage at an extremely low cost, can be prepared with relatively few construction materials, and is particularly adapted to long-term storage of large quantities of materials which are not subject to deterioration. Such a storage space would also be relatively free from destruction by atomic explosives. Even large quantities of conventional explosives would not be as destructive as would be the case if the items were stored at ground level.

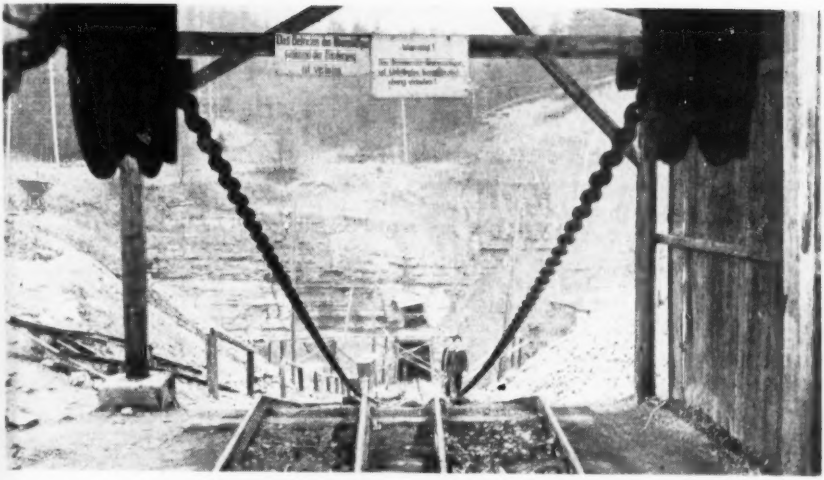
The next type of underground installation can best be explained by describing a typical installation. This second type is actually a true underground installation except that the overburden is insufficient to give complete protection from high explosive and atomic bombs. An installation which best typifies this category is the natural cooler storage operated by the United States Department of Agriculture in the vicinity of Atchison, Kansas. This storage utilizes a limestone quarry or gallery cave burrowed into a hillside. The storage has a total floor space of 590,000 square feet, averaging approximately 12 feet in height, with a gross volume of approximately 7,500,000 cubic feet. Unmined limestone has been left as pillar supports throughout the storage, spaced at intervals of from 30 to 40 feet.

The overburden for this installation varies between 60 and 100 feet, and consists of limestone and earth. Such a small amount of overburden, however, would hardly give appreciable protection against the larger high explosive bombs.

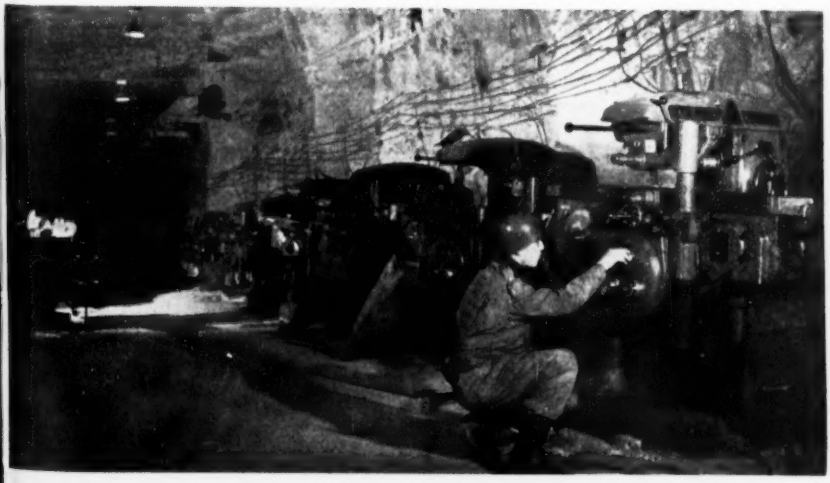
This storage has been equipped with refrigerating equipment with sufficient capacity to maintain an average storage temperature of 30 to 36 degrees Fahrenheit. This installation represents approximately nine-tenths of 1 percent of the total cooler storage space in the United States. The cost of the installation, less refrigerating machinery and equipment, was approximately one and one-quarter million dollars. Based upon the gross floor



Many types of underground installations were used in World War II. Above, one of the factories installed in tunnels in the Riva area, Italy, where the Fiat Company made airplane motors for Germany. Below, an arms factory dug out of solid rock at Utsummiya, Japan; the plant, however, was never able to get into operation.—US Army photos.



The Germans were exceptionally resourceful in their underground program. Above, a narrow gauge railway leads down a steep incline to the entrance of a V-1 bomb factory at Escherhausen, Germany. Below, milling machines in a V-1 factory which the Germans set up in an old iron mine in France and employed 8,000 workers.—US Army photos.



area, this is equivalent to a cost of slightly more than $2.00 per square foot.

The storage has a gross floor area of approximately 15 acres and is all in one large room of polygonal shape, interspersed with approximately 200 irregularly shaped pillars of limestone which support the ceiling. The only interior finish provided was a concrete floor laid over the entire surface, at an average thickness of 5 to 6 inches, which was necessary for the operation of handling equipment. The ceiling was treated with a spray coating of cement and water applied under extremely high pressure to seal off all openings which might permit the entrance of moisture into the storage space. The refrigerating equipment, housed in a building near the entrance, consists of three ammonia compressors, each with a capacity of 250 tons. The refrigeration within the storage space is provided by 48 brine-coil type air units, each having a capacity to circulate 19,000 cubic feet of refrigerated air per minute. The air is further distributed from these units through galvanized sheet metal ducts to provide proper air circulation through the storage space.

The most outstanding feature of this project is the fact that a refrigerated storage space sufficient for 2,600 to 3,000 carloads of perishables was constructed during World War II when there was an extreme shortage of critical materials, yet very few of these materials were used in the conversion of this space. Further, the total cost, of construction was only a fraction of what it would have been for a conventional type cold storage built above ground. Although no attempt has been made to camouflage this installation, this feature could be added for a very nominal cost.

Swedish Plant

Now let us consider an underground installation which has actually been constructed to withstand the effects of atomic explosives. Again an actual installation will be used for the purpose of illustration. In central Sweden there is an underground factory excavated deep into a granite mountain which employs nearly 3,000 workers and manufactures diesel and gasoline engines, agricultural machinery, and various machine tools. As you approach this installation, the only man-made structure apparent to the unaccustomed eye is an innocent looking Swedish farm house, located at the foot of a hill. However, when the hinged walls of this house swing open, much like large garage doors, there is an opening of sufficient size to accommodate large trucks. The entrance tunnel has several right angle turns designed to absorb the blast effect of any bomb or explosive which might be detonated near the entrance. Farther along this same tunnel, large, closely fitting, double steel doors provide additional protection against the blast effect from explosives or the entrance of poisonous gases.

The walls, ceilings, and a large proportion of the machinery, are painted a light color to counteract possible development of claustrophobia by the workers. The lighting, a mixture of fluorescent and incandescent, produces an effect approaching natural daylight. The air conditioning and air purifying equipment within this plant would permit the full complement of workers to remain within its confines for as long as 36 hours, with all inlets sealed, in the event of an atomic or poison gas attack. Conversely, the entire plant can be emptied of workers, all outlets sealed, and a fire extinguished at any point inside the structure within 5 to 8 minutes.

By careful blasting during construction, a Gothic type arch was achieved. Some of the rooms within the plant are nearly a city block long. The plant is completely equipped for production line methods similar to the large industrial plants in this country. Thus, we see an industrial plant

that is as nearly self-sufficient as one can be. The plant owners claim that the construction costs for this plant were approximately 20 percent in excess of normal costs for a similar building built above the ground, and that this particular plant and others of its type will be as much as 10 percent cheaper so far as plant maintenance is concerned over a 30 year period.

Industry and Storage

Let us now consider the possibility of establishing a system of underground industrial and storage installations in the United States. Sometime ago, the Corps of Engineers made a preliminary survey of various caves, mines, quarries, and underground sites for the Munitions Board. Although this survey was only preliminary, it did provide a considerable quantity of valuable data and definite information with respect to location and accessibility of potential underground sites.

For an underground site to provide the necessary protection as well as to be economically feasible as a manufacturing or storage installation, it must be capable of properly handling the entrance and exit of personnel, equipment, and supplies. The Germans made one outstanding error along this line in one of their underground factories. At this particular location, it has been reported that as much as one-half of a labor force shift was utilized to transport workers to and from the surface.

Next in the construction of an underground facility, how deep should we go, or how much overburden should be provided if it is to be made relatively safe? Shall the amount of overburden be in the neighborhood of 300, 600, 1,000, or 2,000 feet? Will a mixture of rock and earth be adequate or will solid rock formations be required? To be on the safe side in answering these various questions, we might assume that an overburden of 1,000 to 1,500 feet of solid rock would be considered safe in the light of present known explosives or those which might be utilized within the foreseeable future.

Next, let us consider a national program for storage installations. Suppose we assume that the open and covered storage requirements for any war in which we may become involved in the future may approach one billion square feet. This amount is in excess of the total military storage requirements in the United States during World War II. Is it reasonable to expect, then, that we may find this one billion square feet of underground storage space in existence today and that it could be readily converted? The answer to this question is definitely in the affirmative. Although some construction work may have to be done to complete certain installations, railroads, and highways, and a rather drastic reorganization effected in our present military storage system, there is sufficient space available. For example, there are not one, but many mines in this country today having a total floor space in excess of a million square feet. True, many of these mines and caves are not totally suitable at present for storage; but given a plan and adequate time for actual conversion, much could be done to obtain this goal of a billion square feet if we start now.

Utilization

How would we utilize this vast amount of space? Is it necessary that the entire amount be underground? Would the additional expense be justified?

Since our industrial potential is so vulnerable to atomic attack, we should have sufficient initial equipment on hand for a balanced M-day force of, say, five million men. Naturally this stockpile of equipment must be protected from atomic attack just as our key industries. There should also be in storage a sufficient quantity of those items which require a relatively long time to manufacture. The supply of such items should be adequate to provide necessary replacements for one year of actual com-

bat. Many of these items are available today, but they are not in completely protected storages as they should be. If the items selected are valuable enough to justify retention for a major emergency, then they should not be subject to loss by surprise attacks.

Finally there is the question of the additional expense. This is like asking a man how much he thinks his life is worth. As long as he is relatively free from danger the amount may be small, but upon the approach of a crises the appraisal of human life seems to be inestimable. So it is with the nation.

What of placing our key industries underground? First, suppose we examine the space requirements for such a program. Let us assume that we need a minimum of 10 billion square feet of floor space. This does not mean that we could put our steel, automotive, or aircraft industries completely underground. It does mean, however, that many of our extremely critical manufacturing processes could be protected by underground installations. A few examples might be the anti-friction bearing industry, optical and precision instrument plants, certain parts of our chemical industry, plants manufacturing critical aircraft components, and our atomic production facilities.

In the location of these underground manufacturing facilities, there are certain basic considerations and requirements which must be met along with the subsurface structure. The first consideration is the proximity of electric power, fuel, and water. These are basic items required for any manufacturing industry. Next, and possibly one of the most important, is the requirement for transportation. The Germans learned, much to their sorrow, that the destruction of power plants and railroads serving an underground facility considerably lessened its value. Finally, there is the requirement for an adequate supply of skilled labor.

If we require 10 billion feet of underground facilities for manufacturing space, and another billion for storage space, we will probably be approaching very close to the limit of availability. By accurately determining our total requirements and balancing these against the existing sites, in order to keep our costs to a minimum, a comprehensive plan can be developed. Locations for manufacturing sites should be given priority over storage sites. Naturally, the requirements for industrial facilities, if they are to be used in peace as well as in war, are by far the most numerous. A few of the more important of these requirements are accessibility of raw materials, nearness to markets, and the economic feasibility of moving from an existing above-ground plant to a new one underground.

A step in this direction would be for the military to operate a site selection service for certain key industries, just as the Corps of Engineers provides for the Army and Air Force. Any changes which must be made by private industry must be thoroughly founded on a sound economic return; otherwise the plant will not move.

Returning once more to one of the lessons learned by German industry, these underground plants should have at least a two-week back-log of raw materials and maintenance supplies. Plant utilities should also be capable of operating for at least one week without supplies from the outside. Officials of Daimler-Benz stated that "more and more it becomes apparent that even a subterranean plant cannot function during air attacks in a satisfactory way unless it has its own power and water supplies, forge, and foundry."

Conclusion

In conclusion, let us consider some of the principal advantages in the utilization of underground sites for manufactur-

ing and storage. It has been pointed out that underground sites enjoy a marked degree of protection, whether entirely or partially bomb resistant. They are also relatively safe from attacks using poisonous gases. Next, a factory or storage facility completely buried under the ground and with few entrances can be readily protected against sabotage. The very nature of an underground installation makes it difficult to detect and accurately locate from the air. Another advantage, and this is especially true in certain parts of the country, is the protection provided from the elements, such as hurricanes and tornadoes.

There are naturally certain disadvantages inherent to underground installations. The first, and probably the most serious, is the added cost of initial construction, although this is offset by reduced maintenance costs. Second, underground sites which would be advantageous from the standpoint of initial cost and protection are not always located within economic proximity to adequate power and labor sources. There is also a psychological disadvantage, if we attempt to place certain of our key industries and storage installations underground. This is what may be called the "Maginot Line Complex." Underground installations will be used as a reason for complacency by those "Pollyannas" who for so long looked to the oceans on our eastern and western shores as an excuse for national impotence. Even if a plan for the utilization of underground installations is adopted on a limited scale, we must not believe that we are safe from the surprise attack of an aggressor.

In view of the experiences of other countries in the construction and utilization of underground installations, and the present possibility of attacks on our mainland, I leave these questions with the reader: "Should we go underground? If so, how much?"

Time is the essence of modern strategy. Twice in a single generation the world has seen the initial weakness of the United States converted by mobilization into military power. Any aggressor of the future, therefore, will most certainly not grant mobilization time. He will attack without warning, not against an outlying base to destroy military forces but against the heart of the United States to prevent the mobilization of national resources.

General Carl Spaatz

Evacuation of the Sick and Wounded in the Second Burma Campaign, 1943-1945

Dr. James H. Stone
Instructor in History, Stanford University

The Situation

GENERAL Joseph Stilwell's campaign to recapture Burma (October 1943 to February 1945) presented a number of unusual logistical problems to the Chinese and American infantry under his command.

Foremost among these problems was the scarcity of communication lines in northern Burma. Literally, only one road capable of bearing two-way military traffic existed in this area. American engineer units built the northern section of the road in the period from December 1942, to January 1943, connecting Ledo, in upper Assam Province, India, with Shingbwiyang, Burma (see Figure 1). South of Shingbwiyang the engineers resurveyed and rebuilt a prewar road running down to Mogaung and Myitkyina. Not until the Allies took those towns in June 1944 did they reach improved roads. Even from these points southward and eastward—the principal directions of advance—lateral communication lines were scarce. It should be observed that after the campaign began in October 1943, the construction point of the improved Ledo Road was *behind* the combat lines.

Throughout the area traversed by the Ledo Road, native trails furnished the only by-passes to the central axis of advance. They could be used only by foot troops and pack animals. Enemy trailblocks almost invariably forced our infantry to cut a path through vines and bamboo thickets of the surrounding jungle to seek a flanking position.

Under such circumstances, it was impossible for Stilwell's staff to contemplate elaborate lines of supply, communication, or evacuation on the ground. Nor was it continuously possible to advance combat supply points, communications centers, or field hospitalization units without overcrowding the single military road or requiring extensive preparation of the jungle terrain to receive such installations.

Medical planners, whose work is the subject of this paper, naturally attempted to solve their problems of supply and evacuation within the general scheme of communications developed by G-4. In brief, supplies were forwarded by air, the material being free-dropped or parachuted from cargo planes of the Tenth Air Force. Almost every conceivable item used in warfare, from delicate medical instruments to personnel, ammunition, water, rations, clothing, signal equipment, and two 75-mm howitzers, was moved by this method. Units on the flanks or behind the enemy's prepared positions were invariably supplied in this manner.

Troops advancing on the Ledo Road, however, received many of their supplies by truck. Both Chinese and American units had pack horses and mules to transport supplies from drop-fields or supply dumps. Marching troops were able to move from

one drop-field to another without vehicles.

The design of an evacuation plan depended largely on the general supply system. However, G-4 faced certain special problems in arranging for the removal of sick and wounded from the combat area. His supplies could be collected in an orderly manner at rear bases and thence moved forward by truck or by air in a pre-arranged sequence. But casualty collection and evacuation necessarily had to fit the unpredictable circumstances of combat. Moreover, the small clearings used to complete an air-drop of supplies had to be accessible by road to an air field, or be large enough to receive ambulance planes before the air-supply program could be reversed to become an air-evacuation program.

The scarcity of medical personnel assigned to the China-Burma-India Theater presented a second major problem. Each Chinese division under Stilwell's command had battalion and regimental medical detachments for first echelon medical service. Second echelon medical service presumably was provided by the divisional field hospitals, corresponding in strength to an American clearing company but incapable of undertaking any serious evacuation effort. Chinese litter-bearers had a reputation for remarkable stamina, but their capacity for evacuation was normally limited to the regimental areas.

Within the Service of Supply base directly supporting the combat zone was a single medical battalion, the 151st. Its function was to evacuate sick and injured men from the engineer units building the Ledo Road. When the Second Burma Campaign began, the 151st was completely absorbed in its primary mission, but in time part of its strength was diverted to the evacuation system of the combat forces. Three months after the campaign began, the 13th Mountain Medical Battalion, less two collecting companies, reached India for duty with the Chinese-American combat command. Full responsibility for ground evacuation from as many as five Chinese divisions and an American brigade ultimately fell on the shoulders of this unit.

Additionally, Stilwell made use of Lieutenant Colonel Gordon Seagrave's polyglot unit of Burmese and British civilian doctors, American medical officers and men, Burmese nurses and technicians, and Chinese and Indian housekeepers. While the unit was not equipped to perform evacuation functions, it proved to have astonishing capacities for holding and treating all but the most seriously sick or wounded patients. Lastly, one American portable surgical hospital per Chinese division or American regiment, and two field hospitals joined the force during 1944, and in the final phase of the campaign early in 1945, four separate collecting companies were added—too late to be of much use.

The air-ground system of evacuation in Burma was based on the general supply system; ground evacuation was localized near the front, and air operations bridged the long gap to the hospitals in the rear area

In short, the problem of evacuation was two-fold. On the one hand, normal evacuation procedures promised to be ineffective because of the difficult terrain and the inadequate lines of communication. On the other hand, the ground forces lacked (and had no hope of getting) the medical units needed to establish a normal system of evacuation. These difficulties, it may be remarked, were no greater than those in any other category of Stilwell's operations. He expected to work within severe

logistical limits, and he was willing to risk failure rather than adopt the defensive posture which was so alien to his experience and nature.

Development of the Evacuation Plan

The opening phase of the Second Burma Campaign enabled Stilwell's staff to experiment with possible solutions to its problems. In October 1943, Stilwell sent one regiment of the Chinese 22d Division, veterans of the First Burma Campaign (1942), into the Hukawng Valley to test Japanese defenses. On meeting the enemy, the Chinese abruptly halted south of Shingbwiyang with three battalions surrounded at widely separated points. Two of them could be reached only by trail. The third dug in beside the unimproved road below Shingbwiyang.

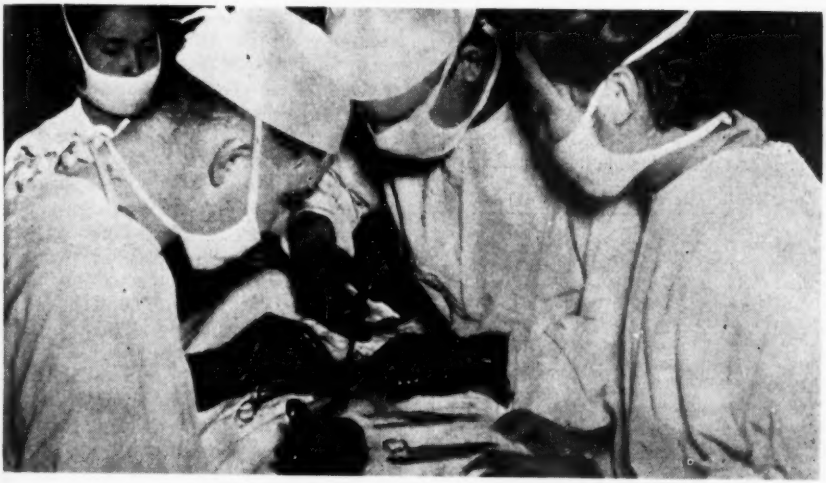
As might be expected, the battalions on the flank could not evacuate their casualties. Small American medical detachments with the Chinese held their patients until they returned to duty, died, or, finally, could be evacuated when the surrounded battalions were extricated in January 1944.

In the center, however, a line of communications was open to the rear. Chinese litter-bearers evacuated casualties to Seagrave's combination clearing station and field hospital. Seagrave held any individual capable of returning to duty within six weeks. The remaining casualties went on to the rear, first by litter-bearer, later, as the weather and the road improved, by litter-carrier jeep, and finally by field ambulance. The destination of these evacuees was Shingbwiyang, some 25 miles from the Seagrave hospital. Beyond, the way to the rear was virtually closed because of heavy military traffic on the new and still hardly completed Ledo Road. A few patients made the jolting, 100-mile trip to Ledo, where they were received by the 20th General Hospital or the 73d Evacuation Hospital, but most of the casualties sent to Shingbwiyang remained there in field hospitals established by the 151st Medical Battalion and, later, by the 25th Field Hospital.

The fact that evacuation was virtually impossible, even from but one regiment of the two Chinese divisions ready for combat, required immediate adoption of a new evacuation plan. Conferences between the staffs of Combat Command and the SOS base command (playing the role of corps and army behind the Chinese-American force) led to the inauguration of an air-ground evacuation system.

For purposes of supply and communication, small air strips were built at Ledo and Shingbwiyang in the late autumn of 1943. In November 1943, the strip at Shingbwiyang opened, and on Thanksgiving Day, the 25th, an L-4 fitted with a litter picked up the first patient to be evacuated by air during the Second Burma Campaign. Before the end of the day, 24 more patients were evacuated to Ledo in liaison planes. The time required for evacuation from Shingbwiyang to the 20th General Hospital at Ledo immediately dropped from an average of 7 weeks to 1 week or less. Two hours were consumed in flight between Shingbwiyang and Ledo.

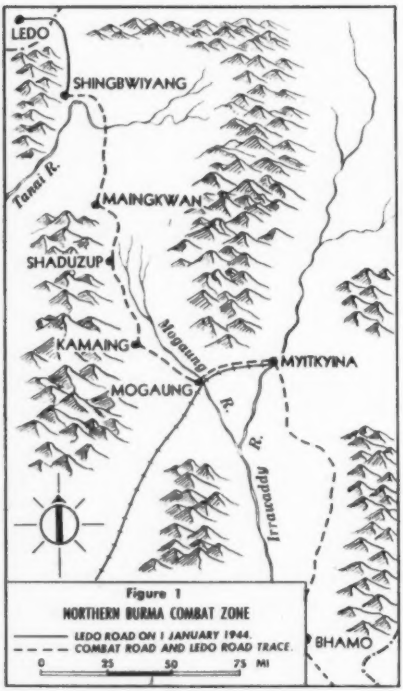
Once tested, air evacuation was enthusiastically pursued. The air strips at Ledo and Shingbwiyang were enlarged, and early in February both were able to receive C-47 ambulance planes of the 803d Medical Air Evacuation Squadron. Liaison planes were then released from the Ledo-Shingbwiyang run to bring off casualties collected at jungle clearings, sand bars, open stretches of the Ledo Road, and, of course, new air strips built as the attack moved southward. The speed and volume of air evacuation rose rapidly as more planes were used, the large cargo planes were employed regularly, and the rest of Stilwell's Chinese and American infantry was committed between February and July 1944. Figure 2 shows the principal fea-



Evacuation of the sick and wounded from the front lines to hospitals in the rear was a major problem in the Burma campaign. Above, a British and an American doctor and two Burmese nurses of Lt. Col. Seagrave's medical unit performing an operation, 1942. Below, an Evacuation Hospital at Ledo, India, October 1944.—US Army photos.

tures of the air-ground evacuation scheme.

Air Clearing Stations soon became key elements in the air-ground evacuation system. Although it varied in accordance with local situations, the ACS normally included at least one medical officer and from 6 to 25 enlisted men. It was equipped to shelter and hold some 30 patients over-



night, but at times as many as 100 patients would accumulate when bad weather closed the air strip. Reserve supplies were kept to meet such emergencies and could be augmented by borrowing from stocks of nearby medical installations.

Communications were organized within the radio channels of Combat Command, the Tenth Air Force, and the SOS base section, where the receiving hospitals were located. Normally, the Air Clearing Station used the Air Force's radio network to notify SOS headquarters when evacuees were ready for flight. SOS placed a request for the flight with the Tenth Air Force, gave the estimated time of arrival of the flight to the Air Clearing Station, and alerted the base surgeon, the local hospitals, and the Ledo Air Clearing Station. Isolated troops not normally serviced by scheduled air evacuation flights used Combat Command channels to call for evacuation. The Tenth Air Force then arranged for a liaison plane sortie which returned the patients to the nearest air strip. As the campaign progressed, SOS placed a medical liaison officer with the Tenth Air Force to coordinate the evacuation program and to establish Air Clearing Stations promptly as new air strips were built.

Triage was practiced by the first American medical officer to see a casualty, again at the Air Clearing Station, and finally at the Ledo ACS. Regimental and battalion detachments provided first echelon evacuation by litter or jeep. Field ambulances of the 13th Mountain Medical Battalion, or liaison planes, connected the first echelon medical posts with the Seagrave hospital, the portable surgical hospitals, or the Chinese divisional hospitals (which received only lightly wounded or minor medical cases). Ambulances or liaison planes evacuated patients from these installations to Air Clearing Stations, which were cleared regularly by two-motored ambulance planes or by cargo planes returning empty from supply missions.

Notably absent from the system were typical second echelon medical installations, and field hospitalization was strictly limited by the scarcity of medical units capable of such operation. Seagrave, the Chinese field hospitals, and the 25th and 44th Field Hospitals held pa-

tients from 10 days to 6 weeks, depending on the tactical situation. Every other medical installation in the entire combat zone evacuated its patients as rapidly as possible, normally by air, to the large general and semi-mobile SOS hospitals in the base section.

Analysis

Four criteria may be used to test the success of the air-ground evacuation program in the Second Burma Campaign. The first is its suitability to the situation. Because of the terrain, the frequent use of flanking and penetration tactics, and the scarcity of ground lines of communication, extensive evacuation by litter or motor vehicle was inconceivable. The combination of air and ground evacuation procedures in the forward areas, using liaison planes, two-motored ambulance or cargo planes, and a relatively small number of medical units, left none of the many large and small infantry units without evacuation for more than a very short time. Even the 5307th Composite Unit (Provisional), on its famous march to Myitkyina in May 1944, was able to move its casualties by animal or litter to liaison plane strips without interrupting its march or greatly risking the secrecy of its mission.

Second, the air-ground evacuation program proved to be extremely economical as far as personnel was concerned. Evacuation from as many as 60,000 troops was carried out with a maximum of two medical battalions (seldom at full strength) two field hospitals (much occupied with hospitalization for construction and base supply troops), eight portable surgical hospitals, up to two flights of an air evacuation squadron, and two liaison plane squadrons (dividing their operations between evacuation and more usual tactical missions). Economy of medical officers, technicians, and equipment was obtained by concentrating medical strength in large fixed or semi-mobile hospitals in the base, instead of spreading them among a large number of mobile medical units, such as would have been employed in a normal ground evacuation system.

Third, the patients were spared a grueling, time-consuming, and dangerous ground evacuation run when their condition was serious enough to require treatment behind division lines. The distances involved and the primitive condition of the road

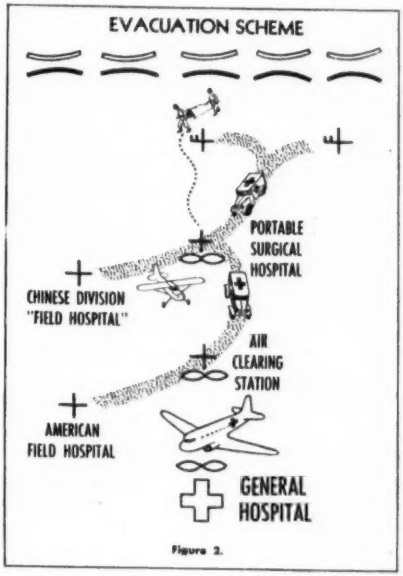


Figure 2.

network would have prohibited the evacuation of most of the serious casualties. The alternative—movement of definitive treatment units to the front—was impractical for the same reasons. The use of ambulance planes, however, permitted the movement of isolated evacuees by air instead of by litter, and of many other casualties by air instead of by motor ambulance.

This factor provided both speedy and

definitive treatment which otherwise would have been impossible. Patients reached the large hospitals at Ledo (and later at Myitkyina) in from 1 to 4 days after passing through first echelon medical posts and portable surgical hospitals. From Myitkyina, which was exclusively supported by air until it was captured in August 1944, half of the evacuees reached Ledo within 24 hours, and all but a small fraction of the remainder were in Ledo within 48 hours—yet the ground evacuation route took 18 days to cover by foot and animal! The condition of patients evacuated by air was exceptionally good. There were few deaths in flight, and none was attributed primarily to flight itself.

Finally, the establishment of the air-ground evacuation system had a notably good effect upon troop morale. In Burma, both the British and American commands found serious threats to combat morale existing in the isolation of the combat area, the scarcity of personnel and equipment, and most of all the necessary use of prolonged flanking and penetration missions in jungle terrain. The British Imperial troops made almost no provisions for evacuating their casualties during a long campaign behind enemy lines in 1944.

The late Lieutenant General Joseph Stilwell and General Sun, inspecting the Chinese 38th Division, then in training in India, in 1942.—US Army photo.

Examination of the troops later indicated that the knowledge that a sick or wounded man would be forced to remain in combat produced a serious decline in morale. In contrast, American infantrymen frequently voiced their gratitude to liaison plane pilots who lifted sick and wounded from seemingly isolated positions; but after air evacuation was temporarily interrupted at Myitkyina, combat discipline of the 5307th Composite Unit finally deteriorated beyond hope of recovery.*

In summary, the main elements dictating, limiting, and characterizing the air-ground evacuation plan during the Second Burma Campaign may be stated. The chief positive element was the inability to use ground lines of communication for a complete evacuation system. In Burma, the difficult terrain and the primitive social and economic condition of the combat area presented this obstacle. Air-ground evacuation could be dictated, however, by other factors—impassable or crowded roads, broken bridges, neutralization of intermediate zones by atomic weapons, etc.

The chief limiting factor was the security of the air. Control of the air obviously was a preliminary step to the use of the air-ground evacuation system. If sufficient control can be attained to permit successful infantry operations at all, it would, in all probability, likewise permit successful air-ground evacuation.

The system was characterized by the omission of typical second and third echelon medical units and the concentration of medical installations in the rear. Ground evacuation procedures were localized near the front, and air operations bridged the long gap between division boundaries and the area of fixed or semi-mobile hospitalization. Triage, practiced at key points, and well-organized communications, permitted the smooth flow of evacuation.

From the viewpoint of the front line troops, the air-ground evacuation system provided the maximum of medical support with a minimum of noncombat personnel and installations at the front. From the viewpoint of the medical service, Brigadier General Isidor Ravdin, Commander of the 20th General Hospital, reported:

". . . air evacuation has played a most important role in the conservation of fighting strength, but there are few areas where air evacuation offered the sole solution to the evacuation problem. It is difficult to believe that any other method could have accomplished the task . . ."

* Military Attaché Report No. R-107-45, M.I.D., New Delhi, India. *Medical Report on the Work of the Special Force*, 5 March 1945, a copy of which is on file in the Office of The Surgeon General. These observations on the 5307th Composite Unit are based on the author's study of medical problems in the Second Burma Campaign, presented in an unpublished doctoral dissertation, Yale University, entitled, *The United States Army Medical Service in Combat in India and Burma, 1942 to 1945.*

The security of this nation cannot rest on one weapon alone nor on one assumption alone. Neither can our military policy be so fragile that human error or surprise attack such as that at Pearl Harbor can disrupt it.

Lieutenant General Raymond S. McLain

The Department of Operations and Training

Colonel G. B. Barth, *Field Artillery*
Director, Department of Operations and Training

AS a result of the recent reorganization of the Command and General Staff College, which was described by Lieutenant Colonel E. A. Salet in the September 1948 issue of the MILITARY REVIEW, a new Department emerged, the Department of Operations and Training. Its program of instruction is designed to give G-3 instruction at theater and zone of the interior level and to teach the functions of the Plans and Operations (P&O) and Organization and Training (O&T) Divisions at Department of the Army level. Thus, along with the Departments of Personnel, Intelligence, and Logistics, this new Department accomplishes the portion of the mission of the Command and General Staff College which requires that the College "prepare officers for duty in the specific general staff section in which they are specialized, at theater, zone of the interior, and Department of the Army levels."

Organization

Bearing in mind this assigned mission, the Department has been organized into three instructing sections. Subjects dealing with the functions of the Joint Chiefs of Staff and the Plans and Operations Division, General Staff, United States Army, are assigned to the first section (see chart). The principal subject assigned this section is strategic planning, which covers 42 hours of instruction.

To the second section falls the task of covering the activities of the Organization and Training Division, GSUSA, and of the Headquarters Army Field Forces (AFF), as well as the very important subject of Mobilization Planning and Implementation, Department of the Army.

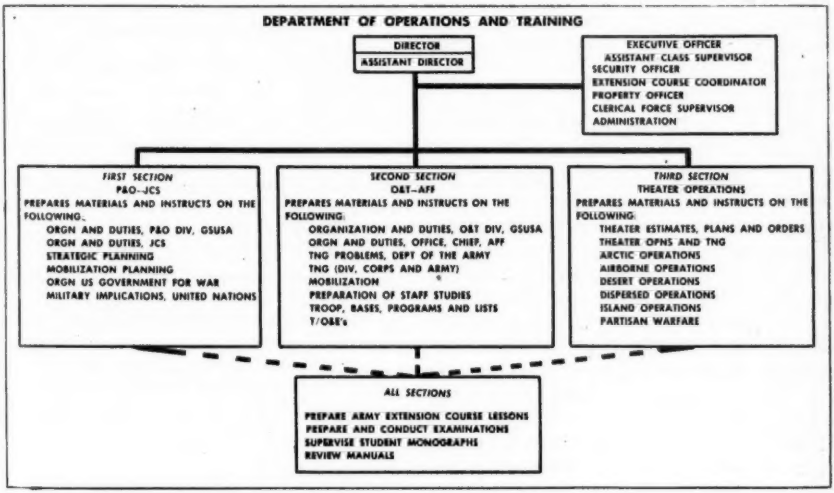
The third section handles instruction at army group and theater level. To it is also assigned problems on island, Arctic, desert, airborne, and dispersed operations and partisan warfare.

Like the corresponding sections in the other Departments of the College, the above sections are given responsibility for preparation and conduct of examinations and preparation of Army Extension Course material pertaining to their respective specialties.

Instructors prepare the subjects assigned to them for discussion, and in due time they appear and present their subjects before a review board consisting of the Director and Assistant Director, Operations and Training Department, the chief of his section, a member of the Department of Analysis and Research and a member of each other Department having an in-

In the Department of Operations and Training, students of the C&GSC receive specialized G-3 instruction to qualify them for assignment at the theater, Zone of Interior, and Department of the Army levels

terest in the problem being presented. For example, when a mobilization subject is being reviewed, members of the Departments of Personnel and Logistics would certainly attend. The author circulates copies of his instructional material to all interested parties at least 1 week in advance of the review date in order that all concerned may prepare themselves for participation. Upon approval of his problem by the review board, the author is ready to prepare his subject matter, including charts and slides, for publication. Before



presentation time, he must brief and rehearse the other instructors of his section who will present his problem to the class concurrently.

Instruction

For all subjects except those dealing with strategic planning, the instruction will be taught in three classes of approximately 40 officers each. This procedure is required by the Commandant's directive calling for instruction in small groups. It requires careful instruction and briefing of the instructors other than the author, but allows much greater student participation than was previously possible when the class met as one large unit. It also has the advantage of producing several instructors trained and prepared for each subject so that the yearly turnover of instructor personnel does not deprive the department of all specialists in any particular field.

Almost all subjects are presented by means of practical exercises in which the student studies an advance sheet containing text references and a discussion of the principles involved in the assigned subject. He arrives at answers to questions designed to high-light the principles that should be learned from his night study. He then studies the first requirement of a practical problem, making notes to be used in the solution of this requirement in class.

When the class convenes, the instructor discusses and answers questions on the study assignment. The class then works

in committees solving each requirement. The class is assembled and several committee chairmen present their committee solutions. Other committee chairmen may be asked to criticize the solution presented and the class may engage in the discussion. Where appropriate, a solution of the requirement is then issued to each member of the class.

Student Monographs

A most important part of the course is the preparation of student monographs. Its chief objects are to give the student practical experience in conducting research, preparing the results of this research in clear written form, briefing his findings, and presenting this brief orally before the class.

As a vehicle for the monograph project, a syllabus entitled "War and National Policy" has been selected. This work was prepared at the Princeton Institute of Advanced Study and at Columbia University. The syllabus was broken down into 119 subjects for student assignment. During the past summer a suggested outline and list of text references was prepared for each subject. This preliminary work was designed to save the student time and effort in getting started on his project. Also, it was necessary to obtain additional copies of reference material for the library so that it could meet the abnormal load placed upon it by the project.

The subjects were divided into three groups and each group assigned to a class. An attempt was made to cover the complete scope of the subject, War and National Policy, in each group of subjects so that students hearing each group would obtain a well rounded comprehension of the subject.

In order to cover the entire syllabus, it was necessary to assign specific subjects to each student. Three choices were offered, thus allowing students some choice in their selection. Aside from the value derived by the student, it is felt that by investigating the whole field of War and National Policy much valuable thought will have been contributed to the College by the students.

When the monographs are turned in and oral briefs made, each student will be graded by a committee of instructors. Each student bearing the oral brief will submit an unsigned comment sheet to the student making the presentation. These comment sheets will not be seen by the grading committee and are designed to assist the student in improving his platform technique.

Monograph Subjects

The scope of the monograph project is indicated by the following list of subjects assigned to one of the three classes:

The Meaning of Security.

Problems Related to Security.

Basic Assumptions of American Security before 1939.

American Foreign Policies Designed to Promote National Security.

Special Measures to Which Nations May Resort in Diplomatic Crises.

Major Stages in the Evolution of Land Warfare.

Legal Concepts of War.

Fascist Concepts of War.

Termination of War: Legal Aspects and Treaties of Peace.

Laws of Aerial Warfare.

Warfare and the Position of Neutrals.

The Nature of Total War.

Operation of the Office of the President in Time of War.

Development of the Concept of War Potential: The 19th and 20th Centuries.

Military Policy: Planning and Coordination Between Civilian and Military Authorities.

The Military Obligations of Citizenship.

The Professional Army: Professional Armies of the 17th and 18th Centuries.

The Army Air Force in the Battle of the Atlantic.

Military Organization: Conscript Armies before 1914.

American Military Forces Prior to and During the Revolution.

American Personnel Policies: Peacetime Conscription in 1940.

Military Organization: The Organization of Command.

Developments in Air Warfare from 1939 to 1948 and Future Potentialities.

The Improved Tank and Airplane and Restoration of the War of Movement.

Technical Problems of the Armed Forces of the United States.

Naval Warfare: Elements of Naval Strategy.

Changing Weapons and Techniques of Naval Warfare to 1914.

Development of Naval Techniques During World War II.

Naval Action in the Philippine Campaign.

Recent Developments in Air Warfare Including the Atom Bomb and Missiles.

Military Techniques: The Assault on Enemy Morale—Historical Background.

Psychological Warfare: Elements and Organization of Totalitarian Propaganda in a War of Nerves.

Political Implications of the Fifth Column.

The Technique of Economic Warfare.

The Home Front: The Psychology of Civilian Morale.

Organization and Technique for Maintaining Morale.

Transportation and Trade Control in Wartime.

The Okinawa Campaign.

War and the Labor Supply: Need of, and Provisions for, Increasing the Labor Supply in Time of War.

The Problem of Labor Control in Wartime.

Wartime Planning for a Peace Settlement: Statements of War Aims During World Wars I and II.

Demobilization and Reconstruction Problems: Financial.

Demobilization and Foreign Policy.

Miscellaneous Aspects

One or more student-forum periods are planned for the purpose of discussing means for implementing training of small units in connection with the expansion program now confronting the Army.

As a means of evaluation of student learning and for rating purposes, three examinations and several graded spot requirements are included in the course. Each examination is preceded by a two-hour review period and followed by a critique.

Each instructor is designated as faculty adviser to a group of nine students. He meets his group at an orientation period early in the course and is available for conference at any time on problems confronting the student. From time to time, he furnishes guidance to the student in the preparation of his monograph subject and, together with one other instructor, rates the student on his monograph, including his oral presentation.

The Department of Operations and Training conducts the same type of specialized training for the Associate Course as for the Regular Course. Time limitations result in the curtailment of certain subjects and the elimination of others. Also instruction is given in the operations of the corps and army, since the instruction given the students of the Associate Course by the Department of the Commander and General Staff includes only the division. No monograph is required in this course but the same system of faculty advisers and student examinations is followed as laid down for the Regular Course.

Along with the Departments of Personnel, Intelligence, and Logistics, it will be seen that the program of instruction of this department comprises an attempt to bridge the gap in the present educational system of the Army resulting from the fact that the Army War College is no longer a part of that system. This can be done only partially, but since Army personnel requirements are such that the course at the Command and General Staff College will complete the formal military education of the great majority of regular officers, it is felt that every effort should be made to give the graduates of this institution the best possible equipment for command and staff duty in the higher echelons of the Army.

NIGHT ATTACK

Lieutenant Colonel Frank M. Izenour, *Infantry*
Instructor, Command and General Staff College

"AND they stood every man in his place round the camp; and all the host ran, and cried, and fled" (*The Bible*, Judges 7-21). Thus ended one of the most successful night attacks in history.

Throughout history, the night attack has played an important role in offensive combat. From the rout of the Midianites at Moreh by Gideon and his three hundred through World War II, history contains numerous examples of both successful and unsuccessful night actions. Those attacks which failed were usually failures because the doctrine of night operations was not applied, or was improperly applied. However, all of these examples indicate that the basic doctrine of night operations has remained unchanged through the ages; only the application of this doctrine has changed with the introduction of new weapons and equipment.

Since one of the best methods of learning the principles that govern the successful waging of military operations is by the study of military history, we will consider the attack by Gideon and his three hundred at Moreh as an early historical example of a successful night attack. This may help us in our search for those principles which are the foundation of our present-day night attack.

The Attack on Moreh

The Midianites, the forefathers of the present-day Arabs, were nomadic desert tribesmen who, lacking sufficient pasture in their own country, crossed the River Jordan in early spring to graze their livestock on the settled lands of the Israelites. The Midianites (see Figure 1) pitched their camp in the vicinity of the hill of Moreh at the eastern end of the valley of Esdraelon. The Israelites were to the south and occupied the western end of Mount Gilboa.

The Israelites, hearing that Gideon was raising an army to drive the Midianites from their lands, flocked to the colors. Gideon, realizing that such an army was unfit for a pitched battle, eliminated approximately two-thirds of his original force by sending home "whoever is fearful and afraid" (Judges 7-13). The 10 thousand that remained were further tested to determine those who were best fitted for this particular operation. Since water plays an important role in any desert or semi-arid country, the test chosen was par-

The night attack is not a "cure-all" or substitute for normal day operations, but a special operation which can be used to overcome enemy advantages in terrain or superiority in personnel or matériel

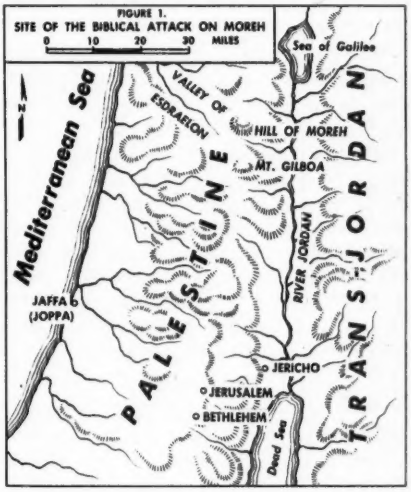
ticularly applicable. As described in Judges 7-5, this test was "Every one that lappeth of the waters with his tongue, as a dog lappeth, him shalt thou set by himself; likewise every one that boweth down upon his knees to drink." The majority, when taken to the stream for water, threw themselves full length and drank while the seasoned soldier, experienced in the ways of war, kept his weapon in one hand and his eyes toward the enemy while he dipped water and drank out of his other hand, ready for any eventuality. The number that remained after this test was 300. Thus Gideon, having sent home all those who had no particular desire for a fight, and having further pared his force by a qualifying (water) test, realized that he would have to defeat the Midianites by guile rather than by force of numbers.

Gideon, knowing the Midianites as a loosely-knit organization of various tribes lacking the discipline of an organized force, surmised that panic, once started, would spread through their ranks. On this fact, Gideon based his plan of attack. As for any night attack, the plans were prepared in detail and a definite objective assigned (the Midianites camp). Gideon next made a personal reconnaissance which indicated that hostile patrols were inactive and which further strengthened his convictions that the Midianites were nervous and ripe for panic. He next organized his force, "and he divided the three hundred men into three companies" (Judges 7-16). Gideon next issued equipment, "and he put a trumpet in every man's hand, with empty pitchers, and lamps within the pitchers" (Judges 7-16). These were rather peculiar weapons, but as Shakespeare wrote in a *Midsummer Night's Dream*:

> Or in the dark, imagining some fear,
> How easy is a bush supposed a bear.

Having completed the necessary preparations, Gideon moved his units to their attack positions from which at a given signal the pitchers were to be broken and the horns blown. The attack was launched at approximately midnight, "So Gideon, and the hundred men that were with him, came unto the outside of the camp in the beginning of the middle watch . . . and they blew the trumpets, and brake the pitchers that were in their hands" (Judges 7-19). The attack met with immediate success, "and all the host ran, and cried, and fled."

In the night attack just described, Gideon recognized and followed certain basic doctrine of night operations, i.e.,



the value of using the best troops available in making the attack, the necessity for detailed and careful planning, the necessity for prior reconnaissance, the necessity for the assignment of a definite objective, and the value of surprise, all of which are just as valid today as they were in Gideon's time.

Keeping in mind the basic doctrine of night attacks as developed from the historical example of the attack on Moreh, we will now examine briefly two night attacks of more recent years. From these,

we will be able to determine the soundness of the conclusions drawn from the attack at Moreh and their application in modern warfare.

The Attack on Vaux-Marie (9-10 September 1914)

On 9 September 1914, the main elements of the German forces in the west were fighting the most critical day of the battle of the Marne while the German Fifth Army was halted on the general line Verdun-Revigny. The German XIII Corps, a part of Fifth Army, was in the Vaux-Marie area disposed as indicated on Figure 2.*

Colonel Etienne describes the condition and dispositions of the French 12th Division on the evening of 9 September as follows:

"All the units were tired and had suffered serious losses during the combat of the preceding days. 'The men, who have not had a single day's rest since the beginning of active operations (21 August), are exhausted,' wrote Sub-Lieutenant F____, of the 106th Regiment; 'in the entire regiment there is only one machine gun in condition to operate.'

"In short, on the evening of 9 September, the infantry of the 12th Division, reinforced by three chasseur (light troops, trained for rapid movements) battalions, was distributed in practically equal parts over the three successive lines. Four battalions . . . were placed in the advanced parts along the line of the railroad while the main body of the infantry (11 battalions) was distributed, on the one hand, along the line: Rembercourt-Hill 285—Signal Erize-la Petite; on the other hand, on the crest Signal de Falel-Hill 289—intermediate crest between the two Hills 309 and 300" (see Figure 2).

The German XIII Corps, a battle-seasoned unit, spent 9 September patrolling, preparing trenches in the vicinity of Hill 285, Sommaisne, and Beauzee, and moving artillery and infantry to the front. During the afternoon of 9 September, the Germans bombarded the French position with artillery.

The events leading up to the German attack can best be described by a translation from the history of the 124th Wurtemberg Regiment. "About 8:00 P.M., Colonel Haas (presumably commanding officer of the 124th), was suddenly called to the brigade, and, at 9:00 P.M., the battalion commanders assembled near the regimental trench in order to await further imminent orders. It commenced to rain, first slowly, then more heavily. The time passed. Finally, about midnight, a Corps order arrived prescribing an attack along the entire front. At 1:00 A.M., the battalions were ready to set out . . . ." Similar events took place in the other units of the Corps.

The objective assigned by the Corps for this attack was the French Artillery in rear of Hill 300. In addition, the Corps contemplated a further advance at dawn to the east-southeast.

At this point, let us digress from our narrative of events and examine this contemplated night operation in the light of our doctrine, and determine wherein the procedure followed in this situation differs.

First, our doctrine contemplates that orders be issued in sufficient time for a daylight reconnaissance of the objectives and the routes thereto. In this situation, the attack order did not arrive in sufficient time to permit a reconnaissance of any kind.

Second, our doctrine contemplates that detailed planning will precede the normal night attack. Here, as evidenced by the late arrival of the attack order, the units making the attack had to make plans on the spur of the moment in order to attack at the proper time.

* Figure 2 and the quotations are from an article by Colonel Etienne, French Army. "Night Combat at Vaux-Marie (9-10 September 1914)."

Third, our doctrine contemplates that the objective be definitely located on the ground, have definite limits on its front and flanks, and be so situated that the objective and the routes thereto can be reconnoitered in daylight. It this situation, the German high command assigned a very indefinite objective, the French artillery.

Let us now return to our narrative for a description of the attack itself. The unit history of the 120th Regiment gives a fairly representative description of the night action. "In spite of the difficult hours through which the troops had passed from the 7th to the 9th of September, in spite of rain, the cold and the wind which raged during this inky-black night, an advance was made along the entire front with confidence, at 2:00 A.M. But, soon, all contact with the enemy was lost; our troops no longer recognized one another; a fusillade cracked on all sides and most of the commanders fell wounded or killed. When the 10th of September dawned with a leaden sky, the regiment, with one battalion of the 127th, was scattered between the Sommaisne-Rembercourt Road and the Vaux-Marie Station; enormous gaps existed in the lines; the troops were exhausted . . . ."

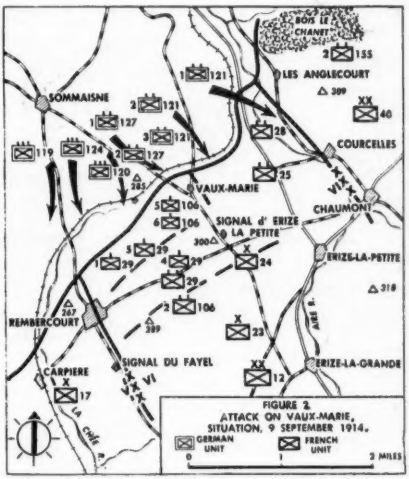
A French source described the attack as follows: "The attack appeared to have two distinct phases: an attack by night which appeared to throw back the French advanced posts established along the railroad; and an attack at dawn which, after bloody and difficult efforts, finished by forcing the second echelon of the 12th Division to retreat. It was finally broken by violent French artillery fire in front of the third echelon (Signal de Falel—Hill 289—crest north of Hill 309)."

The attack at Vaux-Marie demonstrates that seasoned troops attacking an exhausted force, even though achieving surprise, are not sufficient to insure the complete success of a night attack. In addition, detailed prior planning, the assignment of a definite objective, and daylight reconnaissance are essential.

Assault Crossing, Volturno River, 3d Infantry Division (12-13 October 1943)

The American Fifth Army landed at Salerno, Italy, in September 1943, and by 8 October had closed on the Volturno River. The American 3d Infantry Division, a part of the US VI Corps, closed on the river in the vicinity of Triflisco Gap.

On 7 October, Fifth Army issued orders



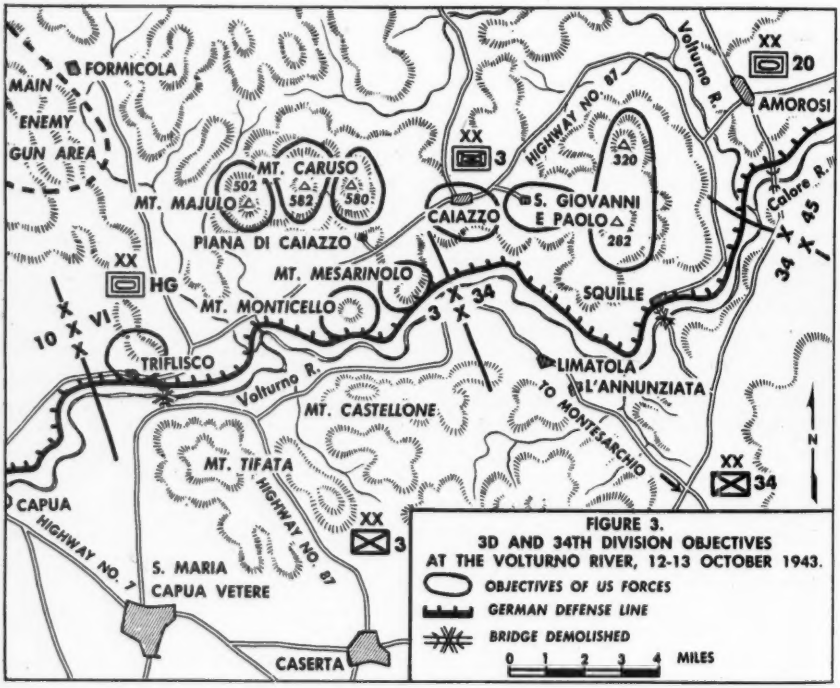
for the assault crossing of the Volturno River. This order directed VI Corps to force a crossing in the vicinity of Triflisco on the night of 9-10 October and attack in the direction of Teano. The VI Corps planned to employ the 3d and 34th Infantry Divisions abreast with the 3d on the left (see Figure 3).*

In the zone of the 3d Infantry Division, the Volturno River flowed almost east and west through a flat valley flanked on

* Figures 3 through 5 are from the publication, "From the Volturno to the Winter Line," MID US War Department.

the north and south by high hill masses (see Figure 4). The ridge running northwest from Triflisco is the critical terrain feature in the 3d Infantry Division zone because it flanks the valley to the east and overlooks the best bridge site in the area. Of almost equal importance are the two hills, Mount Majulo and Mount Caruso, which overlook the entire zone of action.

tion of one hour's duration was to be fired. The main effort was to be made in the center, with crossings on either side of the "hairpin" loop by the 7th Infantry. Additional crossings were to be made on the right by the 15th Infantry (less one battalion) in the vicinity of Mount Castellone and a demonstration was to be made on the left in the vicinity of Triflisco by



The two hills, Mounts Monticello and Mesarinolo (see Figure 5), rising from the valley floor just north of the river, serve to cover the approaches to the hill mass beyond.

On 8 October, at a meeting of regimental commanders, the plan of attack was outlined by the division commander. Preceding the crossings, an artillery preparation of one hour's duration was to be fired. The main effort was to be made in the center, with crossings on either side of the "hairpin" loop by the 7th Infantry. Additional crossings were to be made on the right by the 15th Infantry (less one battalion) in the vicinity of Mount Castellone and a demonstration was to be made on the left in the vicinity of Triflisco by the 1st Battalion, 15th Infantry, reinforced, two hours prior to the actual crossings. The initial objectives were Mount Majulo for the 7th Infantry and Mounts Monticello and Mesarinolo for the 15th Infantry.

The key to the success of this attack was surprise. Upon the relief of the 30th Infantry by the 34th Infantry Division,

the only divisional unit on the river was the 15th Infantry. The remainder of the division was held in concealed bivouac well back from the river. Movements to the river by the assault units were made under cover of darkness just prior to the actual crossings. In addition, an effort was made to conceal the exact strength of the supporting artillery and the exact time and place of crossing by firing a one-hour preparation each morning, beginning 9 October, with not more than one-half the artillery pieces available for the attack.

Upon receipt of the general plan by the infantry regiments, preparations for the crossings began. Day and night reconnaissances were made by those units making the crossings and the best crossing sites selected. Continuous day and night surveillance of the far shore was maintained from observation posts. Unit commanders were taken to observation posts for orientation. Aerial photos and maps were studied to determine the best routes to the objectives and to assist personnel in becoming familiar with the terrain. Detailed plans were prepared and the troops briefed in accordance with these plans. The units were trained for their particular tasks.

The plans for any operation should be sufficiently flexible to enable the superior commander to postpone the operation if such postponement will assist the subordinate commanders. However, the superior should not make, nor the subordinate expect, such postponement if such action will jeopardize the accomplishment of the higher unit's mission. On 8 October, it was seen that some of the units taking part in this operation would have considerable difficulty in completing their preparations by 9 October, and, since a postponement would materially assist the accomplishment of the army mission, the army commander postponed the attack until the night of 12-13 October. This additional time was spent in further reconnaissance, training, and orientation.

Figure 4.

Figure 5.

Figure 4 (left) shows the Volturno River valley from the forward slope of Mount Tifata; in the central background is the Mount Caruso hill mass, objective of the 3d Division. Figure 5 (right) shows Mount Mesarinolo, one of the small hills covering the approaches to Mount Caruso.

Prior to discussing the events of 12-13 October, let us examine the preparations for the operation and compare these preparations with those which our doctrine prescribes for a night operation.

First, the objectives assigned by the division were definite objects on the ground and could be recognized at night. In addi-

tion, the objectives and routes thereto could be reconnoitered during daylight from observation posts on the south side of the river. Second, detailed plans and orders were prepared and issued for this operation. The units were briefed and trained for the particular task each unit was to perform. Third, the troops making the main effort had approximately 5 days for rest, training, and preparation prior to the attack. Fourth, reconnaissance of the assembly areas and the objectives and the routes thereto was conducted by day and night. Fifth, every effort was made to gain surprise. Even though an artillery preparation was to be fired and a demonstration was to be made on the left flank, the when and where of the crossing, as well as the strength of the force, was to be concealed from the enemy until contact was made by the assault units on the far shore.

At midnight 12-13 October, the 1st Battalion, 15th Infantry, reinforced by the heavy weapons companies of the 30th Infantry, opened fire with all available weapons on the ridge running northwest from Triflisco. One hour later the artillery opened up with the one hour preparation. At 0200, the assault units began crossing. They had considerable difficulty crossing the river because of the swiftness of the current and the steepness of the river banks. As a result, the time schedule could not be met, and at daylight, some of the assault units were short of their objectives. However, by early morning 13 October, units of the 7th Infantry were in the vicinity of Mount Majúlo, the 15th Infantry had seized Mount Monticello and Mount Mesarinolo, and a bridgehead was established.

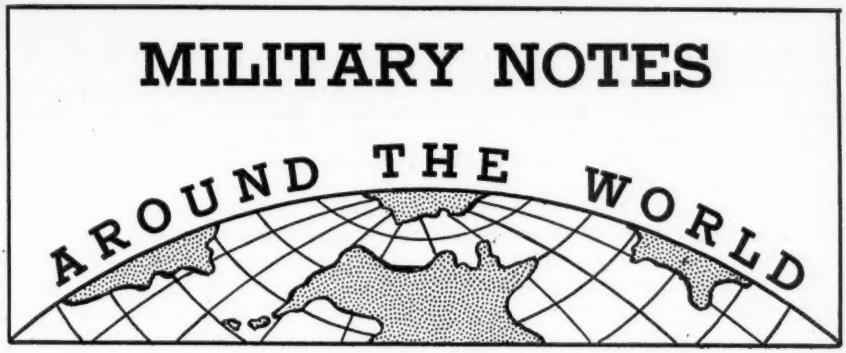
Conclusion

Because of the increased difficulty in movement, troop leading, and maintenance of control and direction at night, the night attack is considered in the category of a special operation. As a result, the commander should normally order a night attack when the most favorable conditions exist and after thorough preparations have been made. Further, a night attack should not be considered a "cure-all" nor a substitute for the normal day operation. The night attack can be used to overcome the enemy's advantage in terrain (the Volturno River crossing) and/or superiority in personnel or matériel (the attack at Moreh). When so used, careful preparations, daylight reconnaissance, definite objectives, well trained troops, and surprise are essential. It must be borne in mind, however, that no set of rules will insure success, but that vigorous execution, coupled with the proper application of these rules, will enhance the probability of success.

Simplicity of plan, careful preparation, secrecy, surprise, and cohesion in execution are prerequisites to a successful night attack.

FIELD MANUAL 100-5, Operations

MILITARY NOTES



UNITED STATES

Stockpile Improved

The national stockpile of strategic materials has been greatly improved but is still short of what it should be, the Munitions Board recently told Congress in a semi-annual stockpiling report for the last half of 1948.

All funds available for the entire fiscal year 1948—1949 had been spent, obligated, or earmarked by the end of calendar year 1948. However, a better balance had been achieved, and stocks of most of the materials being stockpiled were on hand. Quantities are below what is considered essential for national security, however.

The report stressed the high priority nature of the stockpile, stating that it is a vital part of the entire plan for national security. The materials will be for both essential civilian and military use in an emergency.

The objectives of the program are minimum ones. Even when these objectives have been fully met, the stockpile would not be able to cure all wartime shortages. The condition of the stockpile will be considerably better at the end of another 6 months when materials will have been delivered as the result of contracts placed as long as a year ago.—National Military Establishment.

Atomic-Powered Warships

Ships driven by atomic power, the Navy's dream since the new form of energy was discovered, moved closer to reality recently.

The Chicago Operations Office of the United States Atomic Energy Commission announced that a contract had been made with the Westinghouse Electric Corporation of Pittsburgh for the construction of an experimental reactor to meet specifications for eventual use for ship propulsion.

Navy research chiefs have pointed out that an atomic power plant in a large ship would eliminate thousands of tons of weight now represented by boilers, propulsion equipment, and fuel oil. The saving in weight could be utilized by the Navy in strengthening the ships with more armor.

Navy experts also have noted that atomic power plants do not require oxygen. Therefore, "island" structures and funnels could be eliminated. Propellers, too, could be eliminated by use of jet propulsion.

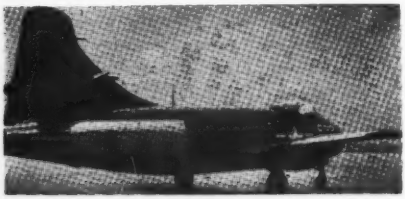
In addition, atomic-powered war vessels could be driven at increased speeds and thus they would be less vulnerable to attack.

No timetable for completion of the experimental nuclear reactor has been set.—*The New York Times.*

Jet Afterburner

Production versions of the Chance Vought XF6U-1 (*Pirate*) have an afterburning device in the tail to give the new Navy fighter more speed under combat conditions. (MILITARY REVIEW, Dec 1947, p. 71.) The afterburner, an auxiliary jet unit, steps up the power of the turbo-jet engine for short periods. The 8-foot cylindrical device is installed on the exhaust nozzle of the turbo jet.

The afterburner works like a ram jet engine. Fuel is injected into the gas flow of the jet engine's tail pipe and burned in the excess oxygen at extremely high temperatures. The device has no moving



Afterburner installed on plane.

parts and hence higher temperatures can be maintained than in the turbine proper. Afterburning gives substantially greater thrust and is currently limited only by the ability of materials to withstand heat.—*Flying.*

Bikini Vessels

Only 10 of the 76 vessels which were subjected to the underwater atomic bomb test at Bikini nearly 3 years ago are still afloat. Nine of these vessels have been decontaminated. The tenth vessel is serving as a radiological defense laboratory. Four of the nine vessels which were decontaminated have been returned to service. Two other ships, the cruiser *Pensacola* and the destroyer *Hughes*, remained too radioactive and had to be sunk, this being done as part of a naval training exercise.—*Armed Force.*

New Rocket Records

A two-stage rocket combination soared 250 miles above the earth to a world record at White Sands, New Mexico, on 25 February 1949.

Made up of a German V-2 with a smaller American-built rocket in the nose, the 15-ton projectile also reached a record top speed of 5,000 mph.

Actually, it was the smaller American rocket, the WAC Corporal, that made both marks. It was launched in the sky from the V-2 at an unannounced height. The smaller projectile was shot by remote control.

The 250-mile altitude eclipsed the previous mark of 114 miles, which was attained in the firing at White Sands of another rebuilt German V-2 on 17 December 1946.

The new speed mark compared with 5,300 feet a second—or slightly over 3,600 miles an hour—which the 1946 V-2 reached in registering the former altitude mark.

White Sands authorities said that the WAC Corporal rocket, normally weighing about 700 pounds, was substituted for the warhead of the V-2, which the Germans filled with an explosive charge in their rocket attacks on London and Antwerp during World War II.

The WAC Corporal portion of the double rocket landed 80 to 90 miles north of the White Sands launching platform. Its flight was tracked by instruments. The spent portion of the larger V-2 came down about 20 miles from the launching site.

The rockets are fired from a point about 30 miles inside the southern boundary of the proving ground, which extends 150 miles north from Fort Bliss, Texas, into New Mexico. The target area is about 35 miles wide.

This record flight opens up new vistas for scientific research in guided missiles and the unknown regions of the atmosphere.—*The New York Times.*

Army Finds Typhoid Cure

Chloromycetin, the antibiotic derived from a Venezuelan earth mold, appears to be highly effective against typhoid fever. The drug has already proved itself a potent remedy for typhus and scrub typhus.

This new use of chloromycetin was an incidental finding by an Army Medical Center team engaged in testing the efficacy of chloromycetin against scrub typhus more than a year ago at Kuala Lumpur, capital of the Federation of Malaya. (MILITARY REVIEW, September 1948, p. 72.)

Out of the 35 patients originally treated, two, it later developed, were suffering from an entirely different disease—typhoid. On these two cases, the effects of the new drug were unanticipated and dramatic. For the first time, it appeared, medical science might have an effective treatment for typhoid infection.

Typhoid is a bacterial disease. Against it, the sulfa drugs, penicillin, and streptomycin, have proved of little value.

The typhus group—epidemic typhus, scrub typhus, marine typhus, etc.—are due to varieties of a different type of organism, the rickettsia. They are more primitive organisms than bacteria and can make their way inside body cells where it is difficult for most drugs to reach them. The ability of chloromycetin to reach and kill them is of the utmost significance to medicine. The rickettsial diseases are rare in the United States.

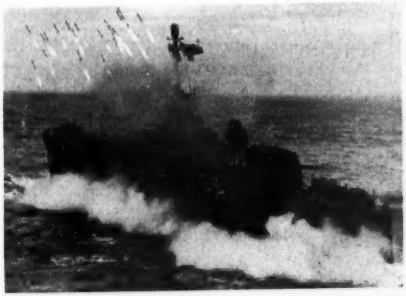
Typhoid, however, is still common. The finding at Kuala Lumpur was so significant that the Army team tested it on eight other proved cases of this disease as soon as they could get more chloromycetin from the United States.

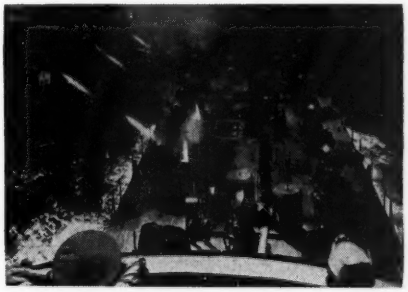
The results were the same as in the first two cases—recovery was well under way in 2 or 3 days. Ordinarily, typhoid fever lasts about a month in the United States and 6 or 7 weeks in Malaya, if the victim does not die.—*Army Times.*

Naval Rockets

Rockets fired from naval vessels played a major role in World War II. Light and mobile, but packing a terrific punch, many rocket weapons were developed and used for tactical and combat purposes.

The rocket program for the Armed Forces was developed by close cooperation





Above, early type LSM(R); below, improved type LSM(R), with automatically fired and remotely controlled launchers.

of the Army, Navy, and National Defense Research Committee of the Office of Scientific Research and Development. Army proving and test bases included Picatinny Arsenal, Aberdeen Proving Ground, Wright Field, and Dover Army Air Base. Navy tests were conducted primarily at Dahlgren, Virginia, Patuxent, Maryland, and Inyokern, California.—*Ordnance;* US Navy photos.

Improved Geiger Counter

A tiny radiation detector which first became known to the public in 1946—the Geiger counter—is going into mass production. Westinghouse Electric Corp. announced recently that steps already have been taken toward the economical precision manufacturing of tubes, instruments, and power units for the heretofore hand-made devices.

The newest radiac (radiation detection equipment) instrument developed is a cylinder of chrome steel about an inch in diameter and six inches long. A heavy wire extends through the center of the tube from a glass insulator at one end to the far end. This wire is covered by a wafer of mica one half of one thousandth of an inch thick.

The wire is surrounded by a mixture of neon, argon, and an exact trace of chlorine. As a beta particle (electron) or gamma ray enters the mica window in the cylinder, some of the gas ionizes, causing a discharge between the wire and wall of the cylinder. This discharge is registered by a click on a sound instrument or by a needle if visual indication of radiation is desired.

It is predicted that the size of radiac equipment will vary depending upon the use for which it is intended. Use of tiny high-voltage batteries, tubes, etc., like those used in making hearing aids, is expected to keep the weight of the portable unit below 10 pounds.—*Armed Force.*

Armed Forces Terms

The term "Armed Forces of the United States" will be used to denote collectively all components of the Army, Navy, Air Force, Marine Corps, and Coast Guard.

The term "United States Armed Forces" will be used to denote collectively only the Regular components of the Army, Navy, Air Force, Marine Corps, and Coast Guard.—Service reports.

Fiberglas Assault Boat

Scientists of the Engineer Research and Development Laboratories at the Engineer Center, Fort Belvoir, Va., are working on the development of better craft for American combat troops who may be engaged in river crossings.

The latest idea is a fiberglas boat. Intensive tests of the material to be used have already been completed.

The boat will be made of fiberglas spun to one-thirtieth the thickness of human hair. It will be woven into cloth and impregnated with tough plastic. The color—olive drab—will be impregnated in the material. Plans call for a boat weighing less than 300 pounds, powered by a 33-horsepower outboard motor. It will carry 15 men.

The wartime M-2 weighed 410 pounds, had only a 22-horsepower motor, and carried 12 men.

Lines of the fiberglas-plastic boats will be different from those of the old plywood craft. The sides will be higher and the craft is expected to be easier to operate in swift water. It will be warp-proof, fungus-proof, and temperature-resistant. —*Armed Force.*

High-Speed Photos

New high-speed photographic equipment for catching the image of objects moving far faster than sound has been developed by the General Engineering and Consulting Laboratory of the General Electric Co. A flash of light, lasting only two-millionths of a second, throws enough bright light on a speeding object to take photographs showing virtually no motion. A camera with its shutter open is placed with the light source in a dark room where the action is to take place. A naval shell in flight at 1,842 mph moves only 65-thousandths of an inch during the 2-microsecond exposure when photographed with the newly devised equipment.—*Ordnance.*

High Speed Wind Tunnel

An air speed of Mach number 5.18, or 5.18 times the speed of sound, was achieved recently in the captured and modernized German supersonic wind tunnels at the Naval Ordnance Laboratory, White Oak, Maryland.

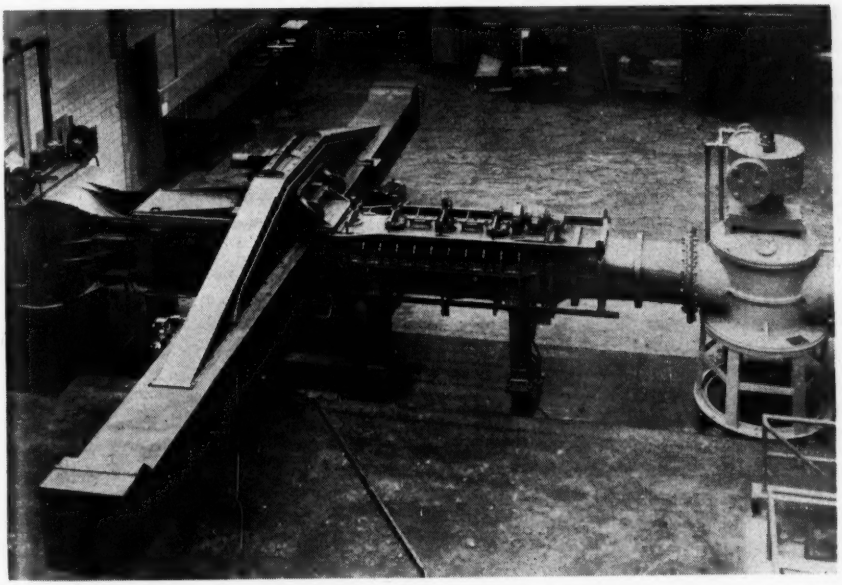
The new high speed was set under a —377 degree Fahrenheit temperature in a 40 centimeter square (16 by 16 inches) working section of the tunnels. The equipment was captured at Kochel, Bavaria, by American forces at the conclusion of World War II. The speed is a new world's record for tunnels of this size.

The record obtained at —377 degrees Fahrenheit is equivalent to 3,960 miles an hour under conditions of normal temperature at sea level.

Preliminary research on the German V-2 rocket was done in the same tunnels but the highest speed previously achieved was Mach number 4.38. The tunnels were dismantled and shipped to the United States in October 1945.

Earlier, the tunnels had been part of the German research institute at Peenemunde. They were officially assigned to the Navy by a decision of the Joint Chiefs of Staff, and were modernized and re-erected at White Oak according to design plans worked out by the Research Department of the Naval Ordnance Laboratory.

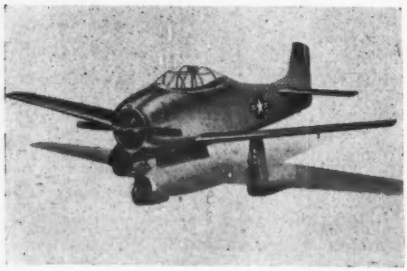
The term "Mach number" has been generally used since 1890 in aerodynamics research in tribute to the German physicist Ernst Mach, a pioneer in the field of aerodynamics.—Department of the Navy.



Working section of the captured German supersonic wind tunnel in which new high speeds more than five times the speed of sound have been attained.—US Navy photo.

New Training Aircraft

The Navy and the Air Force have been sponsoring programs in which the aircraft industry has submitted designs and prototypes of new training aircraft. Two winners of the design competition are the Fairchild primary-basic trainer, accepted by the Navy and possibly by the Air Force,



Two primary-basic training planes. Above, the Fairchild entry; below, the North American T-28.—US Air Force photos.

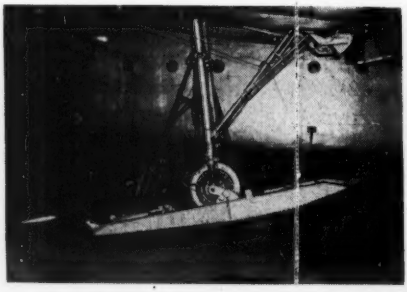
and the North American T-28, accepted by the Air Force.

The Fairchild trainer has a top speed of 174 mph and a cruising speed of 120 mph. Its service ceiling is 15,750 feet, and it has a range of 955 miles.

The North American trainer is designed for a top speed of 292 mph and a service ceiling of 31,650 feet.—Department of the Air Force and Fairchild Aircraft Corp.

Ski-equipped Transport

A C-82 *Packet* has been equipped with skis for operations off fields not cleared of snow. A novel feature of the gear is an aerodynamic rigger attached to the tail end of the skis on the main gear. This small wing holds the ski in the proper position while in flight and helps lift the



Ski attached to C-82 main landing gear.—US Air Force photo.

weight of the installation when the gear is retracted. The plane with the novel landing gear has been undergoing tests at Ladd Field, Alaska.—Department of the Air Force.

Jet-Powered Target Plane

A contract for the development and manufacture of a service test quantity of a high-speed, jet-powered, pilotless aircraft, to be used as a target plane, has been awarded to the Ryan Aeronautical Company by the US Air Force and the Navy.

Fourteen actual designs and bids were submitted for the XQ-2 target plane order. It is a joint Air Force-Navy development project.

The XQ-2 is less than half the size of a standard fighter, and will be used as a target plane for both antiaircraft gunnery, combat plane gunnery, and interception problems. No technical details have been announced.—Department of the Air Force.

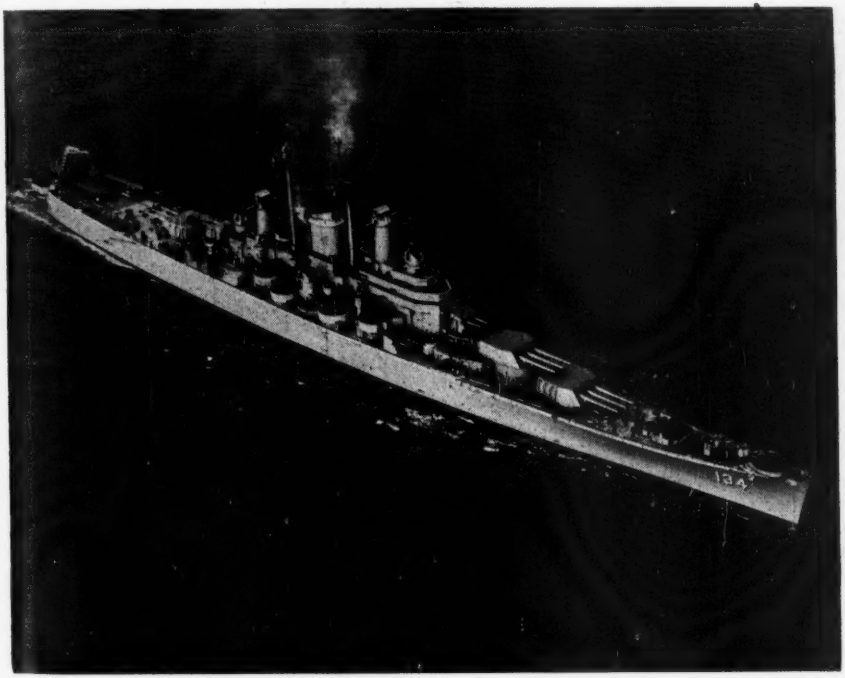
Super Heavy Cruiser

The USS *Des Moines* is the heaviest "heavy" cruiser in the world and the first ship of the US Navy to mount completely automatic, rapid-fire, eight-inch guns.

As the first of an entirely new class of 17,000-ton heavy cruisers to be commissioned, the *Des Moines* is equipped with new eight-inch batteries that are capable of firing at battle ranges approximately four times as fast as guns of the same or larger caliber. The only cruisers heavier than the *Des Moines* are the three 27,500-ton battle cruisers of the *Alaska* class.

The latter compared in size to Germany's 26,000-ton cruiser-line battleships, the *Gneisenau* and *Scharnhorst*. The main battery of the *Des Moines* consists of nine eight-inch 55-caliber rifles, triple-mounted in three turrets. Other armament includes a secondary battery of 12 dual-purpose twin-mount five-inch guns, an anti-aircraft battery of 20 dual-purpose twin-mount 3-inch guns, and twelve 20-mm automatic machine guns.

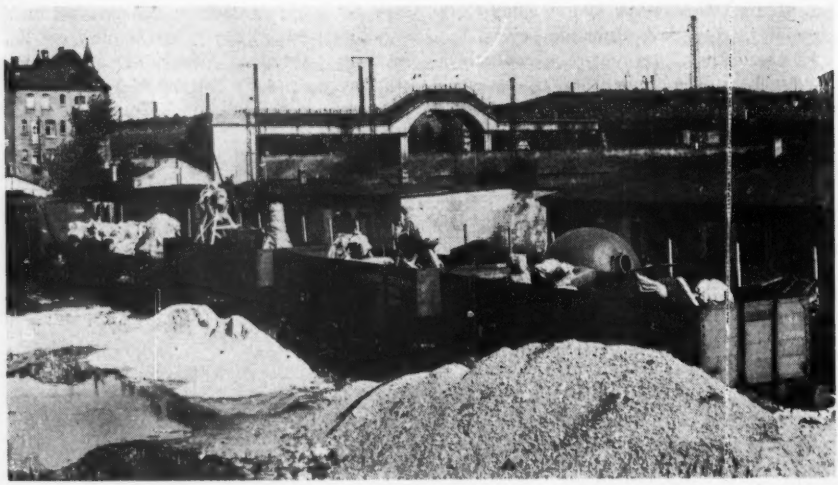
Two sister ships of the *Des Moines*, the USS *Salem* and the USS *Newport News*, are scheduled to be completed in 1949.—Department of the Navy.



The USS *Des Moines* is the first ship of the Navy to mount completely automatic rapid-fire eight-inch guns. Two more vessels of this class will be commissioned this year.—US Navy photo.

GERMANY

Returning Axis Loot



Carloads of machinery being returned to France from Germany.—US Army photo.

During World War II, Germany and Japan systematically looted the countries which they invaded. They seized varied items, including priceless art objects and machinery of all types, which would aid them in carrying on their war effort. After the end of hostilities, the Allied forces uncovered vast quantities of this loot and started the task of returning it to its rightful owners. Many millions of dollars worth of art, machinery, and equipment have already been reclaimed and much more will be returned as soon as rightful ownership has been established. Each of the Allied Military Governments has set up a special section to carry out this vital function.—Department of the Army.

ITALY

Air Force Plans

At the time it indicated its willingness to join the Atlantic Pact, the Italian Government began to bring its Air Force matériel up to date. A 4-year plan has been drawn up, calling for an expenditure of 80,000,000,000 lire (about $140,000,000). Much of this money will be spent on turbo-jet training planes in order that flying personnel may acquire experience with the latest types of fighter planes.—*The New York Times.*

FRANCE

Maginot Line Almost Intact

Regardless of its worth in today's concept of future warfare, France's Maginot Line remains almost intact.

Some French experts believe that studies should be made to determine whether the immense underground forts could be transformed into shelters against atomic attack. Glass and concrete screens could be erected to guard the entrances against blast and radioactive penetration.—*The New York Times.*

GREAT BRITAIN

Newest Naval Fighter

The Hawker N.7/46, a naval strike aircraft, has a speed of "over 600 mph."

Preliminary details have been released on the Hawker N.7/46, a naval strike aircraft powered by a single Rolls-Royce Nene jet engine.

The span of the aircraft is 36 ft. 6 in. and the length is 38 ft. 4 in. No details of its weight or performance are available, but the manufacturer states that the maximum speed will be "well over 600 mph."

Air intakes for the jet engine are situated in the wing-roots. A novel feature of the new plane is that the final jet is discharged from two exits, one on each side of the fuselage in the trailing edge of the wing, instead of from a single orifice in the tail. Such an arrangement allows more room for internal fuel tanks. This should permit greater range than is usual in planes not carrying external tanks.—*The Aeroplane.*

Defense Forces

The British Minister of Defense recently made available to the House of Commons the first of a series of reports showing the military and civilian strength of the country's armed services.

The total strength of the armed forces was 931,000. This figure was broken down as follows: Royal Navy, 144,000; Army, 539,700; and Royal Air Force, 255,900.—*Journal of the Royal United Service Institution.*

Sonic Wall Pierced

British scientists, after a year of unsuccessful experiments, have developed a robot plane which flies faster than the speed of sound.

The robot, an $80,000 flying laboratory which is 11 feet long and weighs 900 pounds, has reached a speed "far above that of sound" in a straight level flight at the Royal Aircraft Establishment at Farnborough.—*The New York Times.*

TURKEY

Destroyers Transferred

The US Navy destroyers *Buchanan* and *McCalla*, which have extensive World War II battle records, were recently reactivated at Charleston, South Carolina. The vessels are being transferred to the Turkish Navy under the act of 3 April 1948, which authorized additional funds for the Greek-Turkish aid program.

A small number of US Navy personnel will remain in Turkey for several months after the transfer to act as instructors and technical advisers.—*The Army-Navy-Air Force Register.*

USSR

Asiatic Uranium

Soviet scientists have discovered uranium within the USSR in the last 10 years in quantities possibly sufficient to provide a basis for the development of atomic power. This is revealed in a study made public recently by the Russian Research Center of Harvard University.

Significantly, the analysis revealed that all uranium discoveries in the Central Asia sector of the Soviet Union were concentrated within a radius of 250 miles of the important Tashkent area. Facilities for the generation of vast quantities of power in hydroelectric plants have been long established in that area.

The location of uranium deposits near a source of electrical energy is particularly notable, because American experience has shown that great amounts of electricity are essential to reduce uranium ore to pure metal and to provide for the ponderous machinery of nuclear research.

The discovery of uranium in the USSR, "while in no sense approaching the great significance of the African and Canadian deposits, appears to provide a possible basis for the development of atomic power in that area," the report stated.—*The New York Times.*

POLAND

Air Force Organization

The geographical organization of the Polish Air Force corresponds to that of the ground forces on which it depends. There are six air zones corresponding to the six military zones. The air command is directly subordinate to the Ministry of National Defense and includes the following bureaus: political education, civil aviation, military aviation, intelligence, signal, personnel, training, organization, parachute, and schools. A large number of air staff officers are Russians. The staff directs the activities of the air schools, and the air divisions, which are organized along Soviet lines. The inspection and training of civil aviation pilots also is a function of this staff.

The Polish Air Force consists of approximately 300 planes. A pursuit division, composed of three regiments, is equipped with *Yak 9s*. A light bomber division, composed of three regiments, is equipped with *Il. 2s*. A special transport regiment is equipped with Douglas *Dakotas*. It should be noted that large units of the Soviet Air Force are stationed in Poland. These include three pursuit divisions, one mixed division, one naval pursuit regiment, and other units. Approximately 500 or 600 Soviet planes are based in Poland.—*Forces Aeriennes Francaises.*

THE NETHERLANDS

Naval Construction

The naval estimates of the Netherlands for 1949 propose the construction of a second flotilla of six destroyers, to be completed in 1955, and four submarines of the latest design. The submarines will be delivered in 1954. Construction of the fleet repair ship authorized last year has been postponed. The personnel ceiling for the year has been set at 24,500.—*The Navy.*

France and the Union of West Europe

Digested by the MILITARY REVIEW from an article in "The Irish Defence Journal" (Eire) October 1948.

THE history of France is the history of Europe. For over a thousand years France has been one of the leading nations, though her neighbors have risen and sunk. France, in the long view, remains the leader of Europe. There is no Europe without France, the source of culture and the arbiter of taste.

As it is culturally in the lead, France is geographically the center of Europe, and has aptly been described as the keystone of the European structure. European recovery means French recovery. Recognition of the country's preeminent position on the Continent has led the promoters of the European Recovery Program and of Western Union to give France an unusual amount of attention in postwar reconstruction.

A strong France means a strong Europe. If France is weak, Europe can be overrun by the new enemy and its history brought summarily to a close. And France is weak, appallingly weak. It is bankrupt. Culturally, economically, and militarily, France now has little to show, hence the abiding terror in the shadow of which we live.

Though moral and economic recovery are of prior importance, it is the military strength and readiness of France which alone will dissuade the enemy and, humanly speaking, avert disaster. The significance of the French Army, Air Force, and Navy hardly needs emphasis. The tragic feature of the situation now is that the efforts of the General Staff and of successive cabinets to rebuild the French defenses have been hamstrung by squabbles in the Assembly over fractional variations in the defense budget, even after the Minister of the Armed Forces had himself heavily pruned the considered proposals of his General Staff.

Defense Organizations

Since World War II, nevertheless, successive ministers have budgeted for an Armed Forces peace establishment of some 770,000, including colonial forces and native troops which come under the Ministry of the Colonies.

On 15 January 1948, the Cabinet adopted a measure fixing the home establishment at 520,655—Army, 325,000; Navy, 58,000; Air Force, 77,373; and Gendarmerie, 60,282. In April, the home budgetary establishment was increased to 602,500 and oversea forces fixed at 165,200, a total of 767,700.

From the 602,500 home forces must be

deducted 4,300 men figuring in the "annexed budgets," mostly military constructional engineers, and 37,300 men not utilizable in the event of hostilities. Military effectives, then, are 560,900, that is: Army, 370,000; Navy, 57,800; Air Force, 76,000; and Gendarmerie, 57,100.

The total credits of 310 thousand million francs which are requested are apportioned as follows: Central section, 49; Army (home), 95; Army (colonial), 68.6; Air Force, 50.9; and Navy, 46.5.

The earlier abolition of the prewar separate ministries of Army, Navy, and Air in favor of a single Ministry of the Armed Forces was followed this year by a further consolidation in the regrouping of the General Staffs of the three arms to form the new Combined General Staff of the Armed Forces. It is jointly directed by the chiefs of the three staffs to deal with all problems of mobilization, communications, higher training, civilian production, research, and intelligence affecting the forces as a whole. This Combined General Staff is distinct from the existing General Staff of the National Defense, which advises the Prime Minister, who is also Minister for Defense, in matters concerned with the direction of the armed forces and with strategy.

It was pointed out in the press that a real integration of the forces on lines similar to those now adopted had been constantly urged by General de Gaulle and other military reformers before the war.

At a press conference on 31 May, the Minister for the Armed Forces announced the government's intention of setting up a panel of general officers trained in combined operations, selected equally from the three services. The "Ecole de Guerre," now redesignated "Centre de Formation des Officers d'Etat-Major," is common to all the services and a new course for staff officers for combined staff work had already begun in November 1947. Candidates for such courses must be between 28 and 34 years of age, and must have six years' commissioned service, of which four were with troops. Further, Army applicants are required to have served four months in Naval and Air Force schools.

A feature of military policy for the home, as distinct from colonial, forces is the idea of a "nation in arms." This is the traditional system of an army based on the calling to the colors annually of all men reaching a certain age, rather than the system of a small highly-trained professional army. The period of call-up was five years when the present system was introduced in the 1870s. It is now one year, after which the men are transferred to the Reserve Army for a number of years and then moved into the Territorial Army or second-line reserve. The number of men called up each year is divided in two, one half (demi-contingent) being called up four months after the other.

Army Training

The former French Army practically ceased to exist as a result of the war and occupation, and has had to be rebuilt from the bottom. Again the young men of France suffered great moral and physical injury as a result of the conditions of occupation. The fundamental nature of French military reconstruction is best seen in the new system of elementary training for which General de Tassigny, Inspector General of the Armed Forces, is responsible.

The system of training recruits in "Light Camps" instead of in barracks is a new departure which has done more than any other of her postwar efforts to restore France's prestige in the military world. To General de Lattre's mind, arms and equipment may change, tactics and strategy be modified with the years, but the constant factor in war is the human factor. Therefore, he says, commence military training by building up the man to endure

periods of fatiguing activity, alternating with quiet spells which he anticipates will be the soldier's lot in modern war, and devise methods of training to arouse the man's faculty for adapting himself to unforeseen situations. Such situations are hardly likely to develop in a barracks and on such "terrain" as may be available to a recruit depot training officer. The man's health is also a prime consideration, hence France's conscripts are to live in the open country.

This emphasis on training the human element for war rather than on technical skill is especially necessary, as France's forces are lacking in equipment. In 1947 alone, only 50 percent of the forces' essential needs in raw material were met. In any case, a good soldier can later be trained in technical skill, whereas a good technician may be difficult to make into a good soldier.

Not that technical skill is neglected. Technical training stresses adaptability rather than specialization. The soldier must be able to change from weapons to vehicles, from sanitation to radio, and be equally at home with different makes of the same type of weapon or vehicle. This, of course, does not indicate that the higher policy of standardization has been abandoned.

Four of the six months in the Light Camps are taken up with basic training common to all arms, the fifth and sixth to completing certain specialized subjects and to forming leaders. The fourth month of the first six is marked by the arrival of the second demi-contingent for training in which the "seniors" share.

A limited amount of formation training has been carried out since the war, notably the Tyrol maneuvers in April 1947, which included air support exercises in the mountains and the experimental dropping of parachutists and supplies at high altitudes. The August 1948 maneuvers in Germany were arranged to include participation of American forces.

Army Formations

The small size of the regular forces and their dispersion to the Far East, Madagascar, North Africa, and on occupation duties in Germany and Austria, make very difficult the creation of formations and formation training. More than six divisions are employed in Indo-China and Germany. Added to this is the scarcity of equipment and also the shortage of officers for higher training. Nevertheless, efforts are being made and plans laid for a new tactical unit somewhat lighter than the existing or prewar division, and capable of being airborne. General de Lattre believes that the Army must provide extremely mobile and powerful combat groups, "capable of carrying the fight to the enemy or of crushing a large enemy operation at any point in our territory, as well as for strong territorial units which can be easily raised and equipped for stopping foreign invasions or limiting their development." The linear concept of protection of territory has been abandoned. In April 1947, the Minister enunciated what may be supposed to be doctrine of his General Staff of National Defense: that the military notions of "front" and "rear" are no longer valid and are to be replaced by the concept of "operational zones." This concept associates static troops with the task of national defense, and requires defense groups of specific regions to operate along with the mobile forces. As announced last March, the government purchased from Britian enough arms, transports, and gliders to equip an airborne division of 16,000. This division, now stationed in North Africa, is being reorganized and used to study and experiment with the new tactical theories.

Union of Western Powers

In solving the current problem of providing a balance of forces in Europe itself—a strong western group discouraging any aggression from the east—the com-

bined forces of France and the French Union must play an essential part. This explains the urgency of their rebuilding and the extreme danger of French parliamentary ineptitude and the unsettlement in French political life. In the event of a shooting war, France would, after the occupation forces in Germany, take the brunt of the first attack. Her territory in Africa might become the base for the forces of the western allies. In July, the Minister for the Armed Forces gave the assurance that the government would defend the soil of France, and would not, as rumored, consider a strategic withdrawal to North Africa.

Despite the disadvantages of untrained forces and the postwar confusion at the head of affairs, France is the strongest of the western continental powers and is ready to take her place in a grouping of the forces of western Europe to forestall aggression. In the diplomatic sphere, steps have been taken in this direction in the Dunkirk Treaty of March 1947, and the Brussels Pact of March 1948; but the need still is urgent for a combined Western General Staff.[1] This is foreshadowed in the arrangements agreed on in Paris last April by the five foreign ministers of the Brussels Pact. One of the decisions at this meeting was the setting up in London of a Permanent Military Committee to pursue the study of the security problems envisaged in the Pact. Even the Dunkirk Treaty, though ostensibly directed at "preventing Germany from becoming again a menace to peace" and not intended as a counteralliance to the earlier Soviet-French alliance, provides opportunity to France and Britain for mutual military cooperation to forestall an attack on France from the east.

The present military situation of France and the French Union is summed up in the words of General de Gaulle:

"The free states of Europe must form an economic, diplomatic, and strategic bloc, combining their production, trade, external policies, and means of defense. This bloc, which would compromise 250,000,000 men, vast and often complementary resources, and outstanding intellectual, spiritual, and moral values, would revive the chances of the Old World.

"To France is due the duty and dignity of being the center and key of a bloc having as its arteries the North Sea, the Rhine, and the Mediterranean."

[1] The Brussels Alliance has now been implemented by the organization of a permanent international command. See the MILITARY REVIEW, January 1949, p. 64.—*The Editor.*

May 1949

Our pleas for peace are measured not by the sincerity with which they are spoken but by the strength we can array to enforce them.

General Omar N. Bradley

Communist Campaign Against Greece

Digested by the MILITARY REVIEW from an article by Cyril Falls in "The Illustrated London News" (Great Britain) 11 September 1948.

THE Greek government offensive against the greatest concentration of rebels in the country, in the vicinity of Mount Grammos near the Albanian frontier, has recently come to an end. The Greek Army had received new material, including mountain artillery from the Americans and heavier calibers from the British. Careful training had been carried out. The troops were in good spirit. The plans and preparations were thorough. And a great victory was undoubtedly achieved.

The last positions of the rebels on Mount Grammos were stormed after prolonged and bitter fighting. Large numbers of the enemy were killed or captured. The installations of the rebel "government" in Greek territory were overrun. But the enemy's corridor into Albania was not cut in time, and it is estimated that about 7,000 men retreated by it to the shelter of Albanian friendship.

I cannot give the numbers of the rebels on and about Mount Grammos, where they had evidently gathered greater numbers than were commonly located in this district for a real trial of strength. The estimate of rebel strength in the north in July is, however, of interest. Facing the Greek II Corps, which covered the Albanian frontier and over half the Yugoslav, there were then believed to be over 10,500 men. For the III Corps, facing the remainder of the Yugoslav frontier and the whole of the Bulgarian, the figure was over 7,500.

It must not be imagined that this offensive was an isolated operation. It was the most important incident of a ceaseless war. In the first six months of 1948, which do not cover the main operation, over 7,500 rebels were killed in Greece; nearly 4,000 taken prisoner; over 4,500 gave themselves up. The last category of voluntary surrenders includes considerable numbers of men taken from their villages with a pistol held behind them and the threat that their families would be killed if they did not join a band. This has always been one of the methods of recruitment of the rebels. Another, far more cruel and sinister, is directed not to present events but to the next generation. Great numbers of children have been abducted in neighboring Slav countries to be brought up in the principles of Communism. No fewer than 300 children were recovered during the operations in the region of Mount Grammos, representing only those whom the rebels had not had time to take across the Albanian frontier. One horrible incident occurred earlier, in the center of Greece, where a small body of bandits, with captured children, were endeavoring to escape by night from their pursuers. Finding it impossible to prevent the children from crying out and thus betraying their position, the bandits killed them.

Government Problems

One may say that the Greek government has been faced by three problems. The first is the defeat of the major concentrations of the rebels on the Slav frontiers and is purely military. The second is the clearance of the interior of the country; this is in great part a matter of police and to some extent moral and social. There exist no bands of more than some hundreds anywhere except in the neighborhood of the frontier. Sometimes trouble is caused by half a dozen desperadoes in a village, who blow up a bridge at night or confine their activity to destroying a truck with a road mine. The numerous mountainous districts of Greece lend themselves

readily to operations of this type or on a rather larger scale. These operations have been in some instances spread to the islands, though they have seldom been serious. The largest of the islands, Crete, and that in which the old Venizelist sentiment persists most strongly, has been singularly free of them.

The third problem, the most difficult of all, is political, a matter of foreign affairs. It is to bring about the cessation of foreign interference in Greece, to stop the aid given to the rebels by the Slav countries to the north. For the moment, Albania is the most prominent in this outrageous conduct. International troubles appear to have to some extent lessened the ardor of the Yugoslavs, at least temporarily, and the Bulgarians have never been quite so active as the other two states.

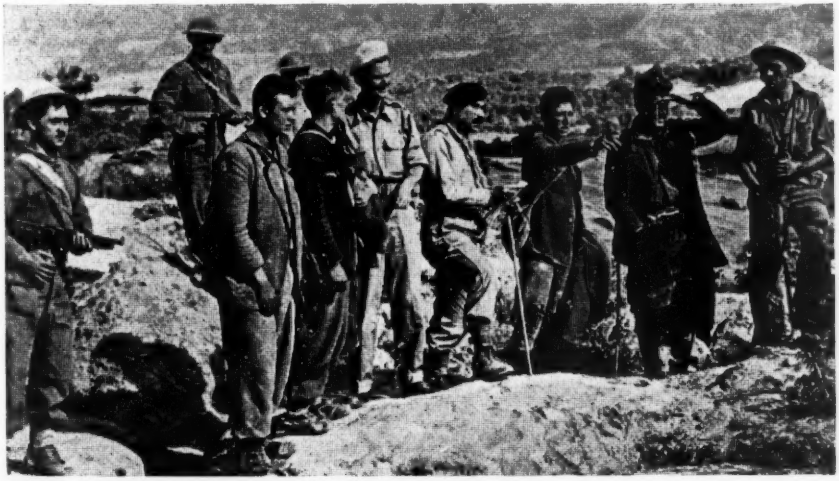
If the United Nations were what that organization set out to be, something could be achieved by its means. The truth is plain and much evidence has been collected by foreign observers. At the outset of this communist war, a number of *Yiafkas* (liaison centers for the transmission of orders and information) were established on both sides of the frontier. From these, the rebels receive their instructions. Through them they send to the bureau established for the purpose demands for arms and equipment. Three of the latter have been identified in Albania; four in Yugoslavia; and no fewer than 15 in Bulgaria, which has much the longest frontier facing Greece. Training camps have also been set up. The earliest and best known are at Boulkes in Yugoslavia and at Roubik in Albania, but there are now about 20 in all. A series of hospitals has been provided. The existence of these is not denied, and it is claimed that their purpose is philanthropic. Alas for philanthropy! Connected with these hospitals are organizations which fulfill the double function of convalescent and transit camps. From them, drafts of rebels, as they recover their health, are sent into Greece to stations where reinforcements are needed.

Arms Supply

The supply of arms to the rebels is equally notorious. Quantities of arms and ammunition have been found on Greek soil and in many cases photographed. Dead Slavs are not found and Slav prisoners are not taken, but the support and the rearward organization is always available. To do the Greek rebels justice, they are prepared to do the fighting if the Slavs provide the means and the corridors of escape. The motives of the three Slav countries are not purely ideological. There is a strong nationalist element in them. The Yugoslavs have declared themselves in favor of an autonomous Macedonia, which would be a creature of their own. The Bulgarians have long had their eyes upon Macedonia, but they have of late agreed—probably on orders from above—to resign these aspirations in favor of Yugoslavia on the condition that they themselves receive western Thrace. Some of the more long-sighted of them doubtless consider that an opportunity to deal with Yugoslavia will come in the end if they exercise sufficient patience, and Yugoslavia suspects that sentiment. ELAS, the old "National Popular Liberation Army," submitted to these claims, but a number of old ELAS fighters, who could not stand the impudent projects for the partition of their country and whose patriotism revived enough to make them protest, have been shot by the Bulgarians.

To oppose with success this type of campaign would not be an easy matter, even if the outside aid were to dry up. Outsiders talk grandly and impressively about accommodation and toleration. It is useless trying to come to terms with an out-and-out fanatic, and some of the leading Greek rebels are fanatical almost to the point of madness. It may be possible to deal moderately with the followers of

Operation *Coronet*, in which Greek government forces won the battle of Mount Grammos, was one of the principal operations in the current Greek campaign. Above, government troops cutting rebel wire in the Mount Grammos region. Below, prisoners point out rebel positions to Greek troops.—*The Illustrated London News* photos.



these fanatics, and there exists evidence of efforts made to do so, though the Greeks are not a gentle people when inflamed by civil strife. But when prisoners are captured by the thousand and when young dupes perform acts of atrocious cruelty, it is not easy to distinguish between the instigators and the imitators.

Again, it is sometimes argued that, since this is a war, the enemy's troops should be treated as belligerents. But no government faced with internal revolt, amounting to attempted revolution, can agree to do that. Mercy may be accorded, but not belligerent rights. And if a group of villagers, who have been living at home and working in their fields for months, suddenly ambush and kill an official or a police patrol, they are murderers, and no hair-splitting can make of them anything else. Education, reform, and revival of a sense of patriotism are slow processes. Meanwhile, military measures for the defense of the state must continue.

The War of Ideas

It is notoriously easier to war against weapons than against ideas, and it has often been said that in the latter case ideas must contribute to victory, if it is to be won. But the difficulty is vastly increased when not only the weapons but also the ideas are provided by unfriendly nations situated beyond frontiers across which penetration cannot be prevented. The United States and the United Kingdom have provided abundant aid and sound advice, without which Greece would have been overthrown and would have reverted to a communist dictatorship, and without which Macedonia and western Thrace would have been torn from her. But there is a subtlety and an intangibility in the methods of the Slav states which have proved undeniably efficient.

In older and more law-abiding days, world opinion, backed if necessary by world force, would have compelled them to make an end of their lawless activities. Now the world is divided and does not speak as one. The affair will be brought before the General Assembly of the United Nations, and a condemnation of the practices of the three Slav states will be worth while obtaining even in these times, but it will certainly be repudiated by the malefactors and their supporters.

Prophecy about the future in Greece is worthless, because that future is so closely bound up with outside events and with the prospects of peace in Europe. It can only be said, on the one hand, that the integrity of Greece will remain secure so long as general peace is maintained and American and British support continues, and, on the other, that at best trouble and unrest cannot be expected to cease for a long time to come. The brilliant victory won at Mount Grammos should certainly ease the hard task before the Greek government, but it will not bring it to an end, as some over-optimistic commentators seem to have imagined. Greece is a country outside the Iron Curtain which has been deliberately picked out by communism as a trial ground. There can be no thought of flinching from the challenge, but suffering for Greece is inevitable, as it always is when a country becomes a battleground between opposing forces and ideas.

The object of any tactical maneuver is to place the enemy at a disadvantage and then to destroy him. This is achieved by a combination of fire and movement, proper use of ground, and the handling of reserves.

Major General Christopher Vokes, Canada

Development of the V-2

Digested by the MILITARY REVIEW from an article by A. R. Weyl in "The Aeroplane" (Great Britain) 23 July 1948.

IN 1935, a detailed memoir on the development of long-range, remotely controlled, rocket bombs was submitted to Hitler by the German Army Staff. In this, the expectation was expressed that the new weapon could be developed rather quickly, provided that sufficient means and a large, special development establishment were made available under orders of the *Heereswaffenamt* (Army Armament Office).

Hitler was delighted at the prospects offered, and the Army High Command obtained an initial credit of 10 million pounds sterling, with a promise of half as much again in 1938. The work at Peenemuende, where the secret development establishment was lavishly built, cost altogether about 35 million pounds sterling, quite apart from the manufacture of the V-2 rocket. This compares most unfavorably with the Allied atomic bomb development.

Hearing of the Peenemuende project, Goering resolved not to be outdone by the Army (which had never taken kindly to him), and urged his *Luftwaffe* staff to follow suit. Thus, the rocket research worker, Eugen Saenger, of Vienna, was asked in 1936 to build a large development establishment at Trauen for liquid-fuel rockets, with no regard as to cost. Just before the outbreak of the war, the laboratory was ready to begin research. It had been lavishly equipped and, among other valuable and unique facilities, it had the largest liquid-oxygen container ever built, capable of housing 110,000 pounds of this material.

Saenger's research program provided for 10 years' fundamental research on liquid-fuel rocket engines, after which engines should be available for long-range aircraft and, in particular, for long-range bombers. The aim was a rocket engine giving 100 tons of thrust for a substantial period. It is interesting to note that while the Army considered projectiles only, Saenger gave preference to winged aircraft and missiles. Obviously, he had the more scientific general approach to the subject. Research on supersonic flight at Mach numbers between values of 3 and 30 and at extreme altitudes had priority in the development program.

On the whole, Saenger's long-term research program was more impressive than the short-term over-optimistic policy of the Army technicians. Nevertheless, the Trauen establishment was closed in the summer of 1942. The reason was that the work at Peenemuende had produced such discouraging results that Goering saw no necessity to pursue his competition. At that time, Saenger and his collaborators were developing a liquid-oxygen oil rocket engine giving four times as much thrust as that of the Peenemuende V-2, and plans to utilize liquefied ozone and metallic fuels were in the laboratory stage. Saenger was put to work on the Lorin propulsive duct, which he had recommended for fast athodyd-propelled (continuous jet) fighters, and was attached to the Special Engine Department of the German Research Institute for Soaring Flight—a demotion he had little deserved.

Significant of the relations between Hitler's Army and his *Luftwaffe* and the mutual distrust among the engineering staff of the *Reichsluftministerium*, is the fact that those who knew about the work at Peenemuende were left in ignorance about the Trauen establishment, and vice versa. Intrigues among the staff officers concerned did not allow comparative assessment, which explains the low efficiency of the output.

Progress made at Peenemuende was disappointing and the hopes raised in 1936 were not fulfilled. The tests of A.1 and A.2, which had taken place at Kummersdorf and were intended to assist the solution of combustion problems during 1933-1934, had been promising. A.1, a relatively small missile with gyro stabilization and fuel feed by nitrogen pressure, had given 660 pound thrust for 16 seconds, and the modified A.2 rocket had ascended to an altitude of 6,500 feet. About a dozen projectiles had been launched with success. A.3, a larger rocket tested in 1938 at Peenemuende, which had some form of automatic control, was tried in large numbers. It had given 3,300 pound thrust for 45 seconds, ascended to 40,000 feet, and had flown over a range of 11 miles. But A.4 (V-2), the rocket intended for operational use, encountered unexpected set-backs; the same applied to A.5, a smaller experimental model of A.4.

Serious accidents occurred during the tests and all demonstrations of the new weapon were such failures that the directing officer was exposed to much ridicule. When, for example, the original A.4 version was to be displayed before Goering and his staff to demonstrate its long-range performance, the first rocket refused to ascend and burned fiercely on the ground. A second one fell back after launching and exploded with a huge detonation. A third one exploded on the ground and burned without moving. After that, the mighty *Luftwaffe* chief was heard to state that he was now fully convinced that the Peenemuende people could admirably accomplish short-range destruction. As a result, the *Luftwaffe* instigated the V-1 development. On another occasion, staff officers were staring out to the sea to witness the descent of a V-2 when they heard the detonation of the descending rocket behind their backs. This had a most undesirable effect on the high-ranking officers.

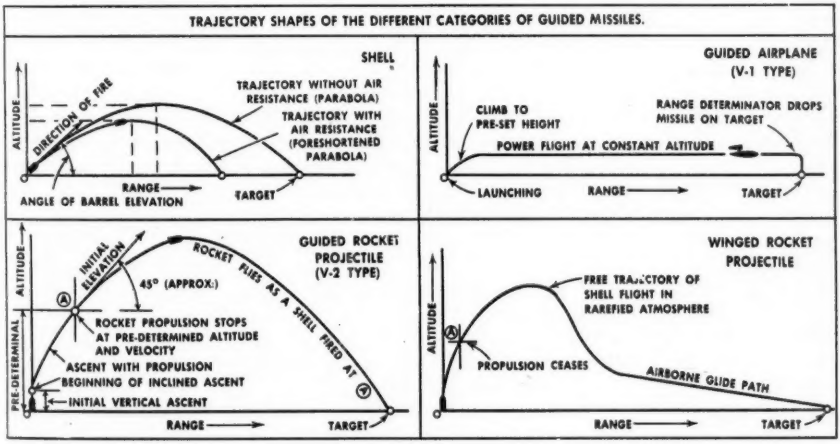
Informed critics have stated that the main reason for the disappointing progress was that the Peenemuende staff was determined to do all the development and design work of the rather complicated, complex, and novel weapon themselves. They should have left special problems to other research institutes and to the qualified industry, as had been done with V-1, and as was the case with radar and the turbojet engine in Britain. If this had been done, many of the failures would not have occurred and much time would have been saved. In addition, it seems that the majority of the Peenemuende staff in positions of responsibility consisted of Regular Army officers who had undergone abbreviated university training, without any experience in research laboratories or in industry. Faced with practical problems of a thoroughly novel character, these people were at a loss and apt to improvise with half measures and doubtful remedies.

The design underwent numerous modifications. Curiously enough, every time a feature deviated from that suggested by Oberth 20 years ago it proved unsuccessful or dangerous. The most successful modification was the introduction of steam-turbine centrifugal fuel pumps, on the basis of the "cold" Walter reaction of calcium permanganate on concentrated peroxide of hydrogen. Other progressive steps were the adoption of graphite for control vanes located in the hot jet and the use of glass-wool lagging for the oxygen container. The fuel feed and its regulation, and the control of the rocket at very high altitudes, had constituted severe obstacles. Also, the low temperature induced by the liquid oxygen continued to impair the reliability of all control devices. Another useful development (also suggested by Oberth) was the additional film cooling of the combustion chamber by the admission of fuel through small orifices distributed over the inner surfaces.

Peenemuende A.4 (V-2)

Experiments with the final version of A.4 commenced in July 1942. In October 1942, the first successful launching was made and the fourth rocket flew 170 miles. At the end of 1942, quantity production orders for the rocket were placed with industry. In one underground works alone (at Nordhausen), 30,000 workers with 25,000 machine tools completed 30 A.4 rockets daily. The German plans scheduled a persistent bombardment of the British Isles with at least 1,000 rockets during every 24 hours. Large production plants and based on wrong information. The large research establishment at Volkenrode, near Brunswick, was never discovered.

On Thursday, 7 September 1944, a German *Sonderkommando* (Independent Special Detachment) arrived at the Dutch town of Wassenaar, near the Hague, and ordered the vacation of houses. On the following afternoon, the first two V-2 rockets were launched against London. The procedure clearly shows the mobility of this long-range weapon. Even railway guns need days of preparation, quite apart



for liquid oxygen and the other necessary chemicals were prepared, and up to October 1944, 12,000 V-2 rockets were constructed.

Systematic reconnaissance by the RAF succeeded finally, in July 1943, in locating Peenemuende and recognizing the existence of large rockets there. During the following month this establishment was "treated" by Bomber Command and great damage was done which delayed development work. A number of technical personnel were killed, but the claim that the leading scientist lost his life was untrue from the availability of a satisfactory permanent way. From various launching places at the Hague alone, 1,027 rockets were launched with 7.7 percent launching failures (mostly with disastrous consequences to the surrounding areas). Only 600 rockets reached the target area. Many strayed and fell into the sea; others were air bursts at very high altitudes. The frequent air bursts during descent have been ascribed to explosions of alcohol-air mixtures in the tank, which was subjected to ram pressure in order to feed the fuel and to stiffen the tank walls. Hence 42

percent of all the missiles launched were ineffective.

Dutch observers found that no failures during launching occurred when the weather was warm, dry, and sunny, while during cold and damp weather as much as 20 percent went wrong at, or immediately after, the launching. Members of the launching crews were frequently killed. Stormy weather prevented rocket launches, as the wind tended to topple them over during filling (V-1 could be launched in any weather). The Americans have overcome this disadvantage by a high superstructure which holds the standing rockets and makes filling and adjusting easier. With this device, V-2 can be launched from ships while under way.

The launching procedure is of the greatest importance for the success of the weapons. Special trailers with cradles for the empty 46-foot rocket were developed. The rocket was hydraulically raised into vertical position and placed on its fins on a special launching platform. The latter permitted adjustment of the missile so that the elevator fins were in a plane normal to the target. It also gave flame protection to the ground underneath the rocket and deflected the jet of the standing rocket so that it would not topple over when lifting. Firm sandy ground was preferred. The filling was accomplished immediately before launching.

The shorter the time interval between filling and launching, the better are the prospects for a successful take-off. Not only is less oxygen lost but the cooling of the rocket due to the liquefied oxygen has a great influence on the reliability of all its vital components. For this reason the fuel pumps and the control compartment of V-2 must be preheated. In all, the preparation and launching of a V-2 required excellent teamwork by a skilled crew. The Germans needed 6 hours to prepare a V-2 for launching; the Americans have been able to shorten this time considerably.

London was bombarded with 2,000 V-2 rockets, Antwerp with 1,600. In both cases, the bombardment was, materially and morally, less effective than that with the V-1 flying bomb.

A masterpiece of British scientific intelligence was the reconstruction of the design features and performance of the German A.4 rocket from debris that the Peenemuende people had unwittingly supplied to Sweden. In June 1944, a rocket had strayed from its course and exploded over Sweden. A team of British experts had occasion to explore the remains. Their description and assessment of the novel weapon proved to be astonishingly accurate and was of great value in the development of defensive measures. Unfortunately, the AA artillery did not have the opportunity to bring radar-guided barrages with radio-fused shells into action against the missiles.

According to the opinion of German experts, the greatest deficiency of A.4 was the absence of radio control during flight. This had originally been intended, but the Germans had failed to find a practical solution. Instead of waiting for such a solution to materialize, Hitler and the Army High Command ordered the immediate use of the weapon. At that time, even direction by means of television reception on the rocket was under consideration. As it was, V-2 was as little guided as a shell. In fact, as soon as the rocket motor ceased to operate at a predetermined altitude and a given velocity of flight, the missile adjusted itself to a preset angle of elevation and coasted along, as would a stabilized shell fired from this position at a similar velocity.

The Battle of the Bzura River

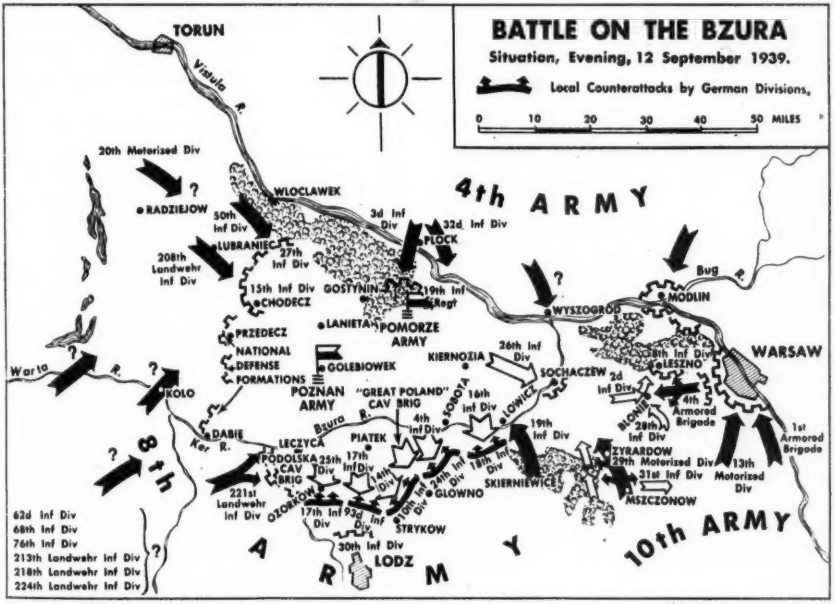
Translated and digested by the MILITARY REVIEW from an article by Lieutenant Colonel Glowacki in "Polska Zbrojna" (Poland) 15-16 September 1948.

THE battle on the Bzura River, called the "Kutnowska" battle by the Germans, was the most important, as well as the only, Polish offensive operation during the Polish-German war of 1939. The Poznan and the Torun Armies, under the command of General Kutrzeba, participated in this battle.

From the beginning, the commander of the Poznan Army advocated an aggressive about-face. He was supported in this by the attitude of the Army. The latter was situated in a favorable position for an attack on the flank of the German Eighth Army, which was pushing the Lodz Army back toward Skierniewice.

General Kutrzeba therefore decided to attack southward against the German flank in order to halt the enemy drive and to obtain freedom of movement for himself in the direction of Warsaw.

The battle on the Bzura began on 9 September. Covering forces on the north and west were provided by the Torun Army.



The Germans Change Plans

The Poznan Army, composed of the 14th, 17th, and 25th Infantry Divisions, attacked in a southerly direction from the north bank of the Bzura in the Leczyca-Sobota sector. Two cavalry brigades, the "Podolska" on the left, and the "Great Poland" on the east, operated on the flanks of the attack.

The attack was successful. The Bzura was crossed, the German defense was broken through, and Leczyca and the hill of Swietej Malgorzaty were taken by the Polish forces.

On 10 September, Piatek and Gaj were taken in violent fighting. The German 30th Infantry Division was defeated. More than 20 guns were abandoned on the field of battle. A great deal of German equipment was seized and many prisoners captured.

On 11 September, the group under General Boltucia (4th and 16th Infantry Divisions) went into action in the Sobota-Lowicz sector. After four days of fighting, it reached the line Ozorkow-Szkolniki-Modina-Kozle-Wola Mokolska-Wladislawow.

General Kutrzeba forced the German command to change its plans as a result of this attack. The Germans assembled 18 divisions, including two armored divisions, three light (armored) divisions, and one motorized division on the Bzura.

On the Polish side, eight infantry divisions and two cavalry brigades took part in the battle.

Overwhelming German Superiority

The situation was clearly unfavorable to the Poles. The Polish units were exhausted by their fighting and initial retreat. The Germans possessed overwhelming superiority in tanks, artillery, and aviation.

On 12 September, the Germans moved out to attack. The aim of this attack was to surround and annihilate the Polish forces on the Bzura.

General Kutrzeba was aware that further attack in a southerly direction was useless. In the initial attack he had counted on a junction with the Lodz Army. Now, however, this army was already at Modlin.

General Kutrzeba decided to draw his units back to the north side of the Bzura. He issued an order for regrouping for action in the direction of Warsaw, by way of Sochaczew and Kampinoska woods.

The Poznan Army was to go by way of Zychlin and Rybno and cross the river at Sochaczew, its mission being to open the way. The operation of this army was covered by the groups under Generals Bortnowski and Skotnicki.

The regrouping was begun on the night of 12-13 September. Until 16 September, the Poznan Army was on the march with the covering group carrying on defensive action.

On 14 September, on orders of General Kutrzeba, General Bortnowski's group, the 4th, 16th, and 26th Infantry Divisions, attacked in the general direction Lowicz-Skierniewice. The Bzura was forced and the attack continued. Because of information received about a German armored column at Blonie, General Bortnowski discontinued the attack.

The 24th Infantry Division withdrew back of the Bzura. This retreat was carried out during the day under German fire. General Bortnowski's order was the cause of very heavy losses to the 26th Infantry Division, as well as to the neighboring 16th Infantry Division.

On 16 September, the divisions of the Poznan Army were assuming attack positions on the Bzura in the vicinity of Sochaczew. The 14th Infantry Division was in the Jeziorko-Emiliano woods area; the 17th Infantry Division was on the march through Rybno, in the direction of Sochaczew; and the 25th Infantry Division was concentrating its forces in the Mlodzieszyn-Adamowa Cora-D. Ruszki area.

At this time, the German XVI Corps attacked. The 1st Armored Division crossed the Bzura at Kozlow Szlachecki. It struck with powerful air support and defeated the 57th Infantry Regiment, 14th Infantry Division. It passed through W. Jeziorko with the 2d Battalion of the 14th Light Artillery Regiment of the 14th Division Artillery. The tanks continued on into

the rear areas of the Polish positions, as far as Kiernozia. The 55th Infantry Regiment (14th Infantry Division) halted the tank attack on Szwarocin, and the 1st Battalion of the 70th Infantry Regiment (17th Infantry Division) halted the attack on Rybno. The 26th Infantry Division held its position.

Hitler Bodyguard Defeated

The German 4th Armored Division and the *SS Leibstandarte Adolf Hitler*, crossed the Bzura between Sochachew and Brochow. It attacked to the southwest. The Hitler bodyguard, the *SS Leibstandarte Adolf Hitler*, in the advance guard of the Division, inflicted heavy losses on the 25th Infantry Division in the Adamowa Gora area, took D. Ruszki about noon, and was stopped only by the 6th Battery of the 17th Regiment of Light Artillery. In a two-day battle, the battery defeated the *SS Leibstandarte Adolf Hitler* armored regiment, destroying 22 tanks. After this defeat, the German units returned to their jump-off positions.

The 17th Infantry Division stopped the attack of the units of the German 19th Infantry Division and hurled them back to the south bank of the Bzura. The 8th Company of the 68th Infantry Division moved to Sochaczew in the evening.

The "Great Poland" Cavalry Brigade was already in Kampinoska woods.

Because of lack of success in the sector of the 14th Infantry Division, the Germans were able to hold the attack of the Poznan Army.

During the night of 16-17 September, the Polish units were forced to regroup again in order to attack in the zone between Sochaczew and the Vistula.

That same night the 15th Infantry Division, the 25th Infantry Division (less the 56th Infantry Regiment), together with the 1st Battalion of the 25th Light Artillery Regiment and the Podolska Cavalry Brigade, crossed the Bzura at Witkowic and Brochow to establish a bridgehead in Brochow and on the southern edge of the forest, and to prevent the advancing German divisions from reaching the Kampinoska woods.

The Last Battles

At 0600 on 17 September, the Germans began their final attack with the support of powerful air forces. They used nine air groups, including two groups of dive-bombers—altogether a total of about 250 planes. This was the most powerful concentration of aviation in the whole of the Polish-German war. Bombing of the area in which the Poznan and Torun Armies were crowded and surrounded lasted from 0900 in the morning until dusk. This bombing attack scattered or pinned down everything that was not able to escape to the shelter of the dense woods, and caused heavy losses in both personnel and equipment. All unit organization was destroyed. Only fragments of the divisions remained, these consisting of only a few individuals. From 17 to 19 September, the fighting was very confused. The units were forced to fight for a crossing. The infantry crossed the Bzura but almost without equipment. Its guns remained behind at the river.

Groups of soldiers were passing through Kampinoska woods. Soldiers from the different divisions were approaching Modlin and Warsaw, fighting as they went.

The large units participating in the defense of Warsaw were the 15th and 25th Infantry Divisions and the "Great Poland" and the "Podolska" Cavalry Brigades. These units were in the Kampinoska woods during the air bombing and they had not been forced to fight their way across the Bzura.

The Military Organization of a Nation

Translated and digested by the MILITARY REVIEW from a lecture by Marshal Viscount Montgomery of Alamein, Chief of the British Imperial General Staff, at the "Ecole Superieure de Guerra," printed in "Informations Militaires" (France) 25 July 1948.

The Strength of a Nation

IF a country is not strong itself, it follows that its army cannot be strong. But the strength of a country in time of peace must not be estimated on the basis of the size of the armies which it keeps on active service. I do not believe that a better example can be found than that of the United States, whose army in 1939 was insignificant, but whose war effort was prodigious. If this point is well understood, all the rest is simple.

The five key conditions of a nation's power are:

1. A strong and healthy national character.

2. Powerful industrial potential, judiciously distributed over the country.

3. Perfect organization of scientific research.

4. A limited army on active service, supported by the contingent and the reserves, subjected to regular training periods, the whole being capable of being mobilized with maximum speed.

5. A state of preparedness.

The actual strength of a country rests in its people, in their virility, in their capacity for work, and in their patriotic spirit.

Good leaders are needed, however. Just as God governs in heaven, so man must govern on earth. If he does not do so, life becomes chaotic; the ship goes adrift and is broken to pieces on the rocks.

Any nation which observes these conditions is nearly certain not to commit any fundamental error.

Defense in Modern War

It is important to determine clearly the means of defense in modern war. Any nation which is called on to face modern war must be equipped with certain essential requirements.

It is necessary in time of peace to divide the resources of the country between the needs of economic production and those of the armed forces. The entire national economy must be prepared to assist in the preservation of the national existence. The armed forces must be large and suitably equipped with modern weapons and ammunition.

It is necessary to keep men under arms or in reserve formations in order to form an expanding nucleus about which all the fighting forces of the country may be rapidly assembled.

The country must be protected against all surprise attacks, and must possess a good organization for civil defense.

The country must possess in time of peace an efficient system of command and surveillance over the war machine which will permit it to develop to the maximum, without the risk of vacillations in transforming this system in the face of a threat of war.

"Push-Button" War

I should like to put you on your guard against certain persons, including some scientists who are unqualified for judging such matters, who maintain that another war will be fought by pressing buttons and that the army has no part in modern operations. No doctrine can be more incorrect or dangerous. It must not be forgotten that scientists have never constructed any new weapons nor accomplished any labor which can justify the ex-

clusion of the modern technique of military operations on the ground.

As in the past, we must be prepared for operations on the ground. Any claim that an enemy nation could be led to capitulate solely as a result of air attacks is dangerous and cannot be accepted.

The fundamental principles of war scarcely change, but are, however, influenced from generation to generation by increasingly powerful armaments and increasing mobility. I believe firmly in the doctrine which states that the battle decides all; victory in combat contributes to over-all victory.

Today, the essential element of the armed forces, the one which is able to hold a defensive position, to seize possession of an important position, to hold it in the face of every offensive, and to exercise direct control over an enemy people, is the infantryman. The airplane or the atomic bomb are not able to eliminate the infantryman any more than did the invention of powder.

The ground force soldier who is able to make use of sea or air transportation for reaching his combat sector, and who is then able to live, fight, and maintain himself for weeks and months in any kind of weather, is more than ever the keystone of the military effort. Nevertheless, every soldier must understand that at the present time he is but one member of a team.

Ground operations cannot be considered without taking into account the air situation. Air superiority is an indispensable condition which must be achieved if ground operations are to be efficient and are to realize final success. This applies particularly to ground offensives.

Teamwork in World War II permitted us to attain victory, and this teamwork will become more and more important as times goes on.

Division of the resources of the country between the needs of economic production and those of the armed forces in time of peace is a never-ending problem. Generally speaking, future wars will see the employment of weapons which have already been manufactured before the beginning of operations. It is certain, however, that during the course of a war new scientific discoveries will constantly be made.

It is consequently clear that vigorous scientific research is indispensable at all times. Its aim is to conduct war with more highly perfected weapons than those of the enemy. It is necessary that there be a well-defined relationship between research and production, and this must be accurately established and adhered to.

Organization of the Human Potential

Modern war is total and engages all the men and women of a nation in all the complex aspects of its industrial organization. It is indispensable that a system of organization be established to coordinate the human potential in the military and economic effort of the nation. This presupposes as well a studied system of selection for the armed services in order that all disorganization may be avoided in the war effort of industry.

The problem is complicated by the necessity of ordering peacetime economy as a function of war. No nation possesses the means for maintaining large active armies.

The problem which presents itself, therefore, is this: How, in time of peace, may we organize the human potential in order to avoid disorganization of the national economy, and yet reserve the means of rapidly mobilizing our total military strength in case of a crisis?

It is easy to establish the order of battle of a national army on paper, basing one's calculations on the human potential raised by the government. But such an army cannot be maintained on active service in time of peace. Nevertheless, its framework must exist. Cadres must re-

main organized and the men who are to make up the units in time of war must learn their work in time of peace. This implies the existence, in time of peace, of a reserve army based either on obligatory service, voluntary enlistment, or a combination of the two systems.

In Great Britain, we have built up our reserves—which we call the Territorial Army—through the adoption of a combination of obligatory and voluntary service. The officers and noncommissioned officers are voluntary enthusiasts, assisted by a small cadre from the Regular Army. The majority of the men will be called for their National Service and will remain for six years in the reserve Territorial Army after having completed their 12 months of service under the colors.

If these reserves are to possess any worth, three essential conditions must be fulfilled:

1. They must possess cadres of active elements.

2. They must be trained by these active elements.

3. They must have the support of the government and of the people.

On these bases, the national army should consist of the following three elements:

1. The active element.

2. The conscripted element.

3. The reserve and Territorial Army element.

These three elements are mutually complementary and form a well-balanced ensemble, the National Army.

The active elements train the conscripted elements, then pass them along into the units and formations of the Territorial Army, where they will serve for several years until they are assigned to the reserve.

Thus, there will be a continual flow of well-trained men into the Territorial Army from whence there will likewise be a continual flow of men who will constitute the reserve. The success of this plan depends largely on the quality of the active element, which must be of the first order. Its responsibilities will be heavy, both as regards the training of the conscripts and the supplying of the permanent cadre of the reserve formations.

Of course, it will also be necessary to maintain a sufficient number of active units to meet peacetime requirements, and to furnish immediately forces of sufficient strength to take care of any eventual disturbances of secondary magnitude which would not justify calling out the National Army.

It will also be very important to insure that the officers and staffs of the Territorial Army and of the reserves are thoroughly prepared to assume the task of commanding and training their formations. The active army must give its full support to the training and organization of signal service and tactical exercises without troops, as well as to the organization of periodic, large-scale exercises with the participation of troops. The latter training must be carefully arranged in collaboration with the responsible government officials and leaders of industry.

I have reflected a great deal on the organization of a modern army, and have discussed it at length with the higher army commanders and government ministers both in Great Britain and abroad. I am firmly convinced that a National Army established on these principles meets the needs of a modern democracy. It is the only solution which meets these two fundamental needs:

1. Minimum interference with the peacetime economy of a nation.

2. Ability to mobilize a powerful and well balanced army.

This problem is the most important, and probably the most difficult, to solve of any that confront the men who direct the various countries. Our very existence, in peace

as well as in war, depends on its correct solution.

Civil Defense

The orderly functioning of government and the economic life of a country will depend on the efficiency of civil defense. Any nation that neglects this consideration will find itself completely disorganized.

Moreover in a future war, the non-combatant population will without doubt be subjected to privations and sufferings far beyond those heretofore endured. The mental tension of the entire nation—which means the will to fight—will be considerable.

It is quite evident that the responsibility assumed by each soldier is of major importance. That is why it is natural and just that we who are soldiers should take an interest in it, though we are not directly responsible for it. We must, nevertheless, be thoroughly aware of the close relationship which exists between civil defense and the fighting units, and we must be ready to play our part in aiding the civil authorities at the first call.

High Command on the Battlefield

In military operations, the commander in chief should attempt to guess the thoughts of the enemy, to foresee the enemy's reactions to his own movements, and to make rapid decisions in order to forestall all enemy intervention that could interfere with his own plans. He must be ready to seize the initiative. He must be able to think clearly and to perceive the essential factors from the mass of those which constitute each problem. He must be able to inspire confidence in his soldiers and in the entire nation.

He must maintain a close watch over the mental state and the morale of his armies. To be able successfully to accomplish this task, he must be continually present at an advanced command post or at a tactical command post in the combat sector. From this point of vantage, he will be able to concentrate his entire attention on the operations and to remain personally in close contact with the fighting units.

If he is far from the front lines and engrossed in important activities which have no direct connection with the operations in progress, it will be impossible for him to direct simultaneously any large-scale operations. Under such conditions, there would be no close check on the fighting; the operations would tend to slacken and depend on the action and success of the subordinate commanders.

It is indispensable in combat that plans be studied in advance, in order that the development of operations may be facilitated in accordance with data previously obtained. If the commander in chief is always at the front in the tactical command post, he will be in a position to take advantage of every opportunity for improving and consolidating the tactical position of his troops. Every situation arising from favorable or unfavorable operations must always be followed by an immediate reaction.

Close surveillance must be maintained over the development of operations in order that they may be maintained within the frame of the action as planned. If this is not done, the differing conceptions of subordinate commanders will result in compromise or the operations will develop differently from what was originally planned. From the administrative point of view, it is necessary that there be a close, well-defined, and lasting relationship between operational plans and administrative resources.

The success of administrative "planning" depends on the ability to foresee needs. Therefore, the commander in chief must always keep his staff posted with regard to his future intentions, in order that administrative preparations may be completed in time.

Lastly, the supreme test of every officer who aspires to high command is his ability to perceive immediately the essential points in a military problem, to make rapid decisions, to explain clearly his plans and the manner in which he intends to execute them, and to see that his subordinates diligently carry out his orders.

Above all, he must avoid all useless detail and concentrate on the essential factors and those details alone which are necessary for the execution of his plan.

Details are the task of the staff, and a real leader must be able to divorce himself from them. He depends on his collaborators for working out the necessary coordination and relies on them.

The Human Factor

The human factor is actually the greatest. Man is a moral being. He has need, for his physical and moral equilibrium, of a faith and an aim which can warm his heart and stimulate his imagination.

Consequently, you must study the men who are under your orders if you are to obtain the most from them. If you are able to win their confidence, they will execute your orders and will give to you the best that is in them at all times. You must make them understand that you are safeguarding their interests. A confidence that is mutual must be established, not one that is one-sided.

Turkey Today

Digested by the MILITARY REVIEW from an article by Lieutenant Colonel H. E. Crocker in "The Fighting Forces" (Great Britain) August 1948.

THE rapid expansion of Russian influence in the Balkans has emphasized the important role that Turkey plays in the strategic situation in southeast Europe. Placed as she is mainly between East and West while, at the same time, she commands the exit from and entrance to the Black Sea and the southern Russian ports. Turkey assumes today an even more important command of the situation than she has hitherto.

The Soviet government has for some time been alive to the importance of the Turkish situation, both from a geographical as well as a strategical point of view. This has culminated in repeated demands for a joint Russo-Turkish command of the Straits and the establishment of Russian military posts on Turkish soil. The Turkish government has rejected these demands on every occasion.

Strategic Influence

During World War II, Turkey exercised considerable strategic sway over the operations of the Axis as well as the Allied powers, and in spite of the apparent reverse of the British arms she clung to her alliance with Britain through thick and thin. She firmly resisted the blandishments and threats of the German government to allow German troops to move through Turkey on their way to Palestine and Iraq. She maintained her neutrality throughout the war, though, strictly in accordance with the existing treaty with Britain, she should have entered the war against Germany. It was fortunate for us that she did so refrain, for, had she become an open belligerent, nothing could have prevented the German armies from traversing Turkey and attacking Egypt while Rommel pushed his advance from the west. Threats to Turkey were serious but they did not mature. The main German invasion was planned to cross the Black Sea from Rumanian ports, land in north Turkey, and

advance on Iraq and secure the oilfields. Meanwhile, the Bulgarian Army, which had been kept intact by their king on the plea of a threatened Turkish invasion, was to seize and hold Constantinople and the Straits. At the same time, a third force, composed principally of airborne troops, was to fly from Crete to Alexandretta and to act as a retaining force to prevent the British Ninth Army in Northern Syria from coming to the assistance of the Turks in their efforts to repel the main German attack. Small motor torpedo boats assembled at the mouth of the Danube would at the same time operate in the Black Sea and destroy the Russian fleet and also protect the passage of the German forces in their oversea expedition to Turkey.

The control of the Straits has for many years been a concern of the Chancelleries of Europe. By degrees, the absolute control which the Turkish government formerly exercised over the passage of foreign ships was reduced. After World War I, when Turkish influence no longer existed, a convention was drawn up at Montreux. This convention laid down specific terms by which the ships of all countries should be allowed to pass through between the Black Sea and the Mediterranean on lawful missions. This convention gave Turkey a very considerable share in the control of shipping. Recently, the Russian government has demanded a revision of the convention. To this, the powers and Turkey have agreed. But the demands and suggestions for the new convention, put forward by Russia, have not proved acceptable to either the powers or to Turkey. The latter, naturally, is most interested in the question of shipping passing through the center of her country.

Russian Demands

The demands by the Russian government may be summarized as follows:

1. No warships of other countries to be allowed to enter the Black Sea.

2. Free passage for all Russian ships at all times, both merchantmen and ships of war.

3. The right to establish military bases on Turkish soil to control the passage of the Straits and to insure that the conditions of the preceeding clauses are adhered to.

The Turkish government has turned down these demands and has stated that the question of the control of the Straits is one that does not only concern the Black Sea powers.

The demands of Russia for military bases in Turkey, coupled with her demand for a share in the control of Tripoli and Eritrea and a port in the Red Sea, point to her anxiety for her own protection rather than to an idea of aggression into these countries. She concentrates on her system of penetration in Europe, and herein Turkey sees the danger that encircles her. The Straits could no longer be defended by the shore fortifications which defeated British attempts to force a passage in 1915. The intervening 30 years have developed air forces to a height undreamed of at that period and any land fortifications would now be at the mercy of a country which had command of the air. The Turkish situation grows more difficult almost daily. Russian influence is dominant in Rumania and Bulgaria and of recent months in Czechoslovakia. Turkey thus sees herself threatened on every side—Persia and Azerbaijan to the east, the Balkans to the west, and Russia herself to the north. Turkey realizes the vital necessity of adequate defense against any possible invasion and is thus forced to maintain an army of a million men. This takes much-needed manpower from industry and agriculture and from producing the food that she needs.

Were the Russians to gain control in Turkey, as they have done in the Balkans, Russian influence would extend to the

northern shores of the Mediterranean. This would put Russia in a position to exercise considerable control over shipping passing through that sea. No ship would be able to sail between Europe and the Suez Canal and escape Russian interference.

We hear little of Russian demands on Turkish territory of late, and the question of Russian military posts in Turkey appears to have been shelved for the moment. Doubtless Russia is waiting for a favorable opportunity to erupt with redoubled force. During World War II, Britain and America supplied Turkey with vast stores of arms and munitions of all descriptions for defense against the threatened German invasion. At the present time, the American Mission in Turkey is considering how American assistance can be employed to the best advantage. Turkey, left to her own resources, could not withstand any attack for long. However, Russian strategy with regard to Turkey would be more likely to follow their accustomed device of infiltration by peaceful penetration and the seizure of the civil government by Russian-directed communist intrigue. The inevitable "purge" and so-called "trial" and elimination of anti-Communists would follow as a matter of routine. Turkey would thus join the rest of eastern Europe behind the "iron curtain."

Fears of Invasion

From the statements that have been made by the Turkish President and Prime Minister in the Grand National Assembly at Ankara, it is evident that the Turkish government has very real reason to fear an invasion from a foreign power. Their statements refer to the unjustified accusations and demands on the part of Russia which constitute a violation of Turkish sovereignty. It was further stated that these accusations and demands had not been withdrawn. Turkey, said the President, was bound to defend herself, especially in an area which might become a target for sudden attack. It is evident from these statements that this veiled threat against the integrity of Turkey influenced the Turks to continue martial law in the area of Istanbul, Thrace, and the Straits since 1940 and to extend it for a further period of six months. At the same time, the budget committee approved an extraordinary credit of 476 million dollars for national defense, which amounts to about $24 per capita.

In July 1947, an agreement was signed at Ankara with the United States providing for the use under the "Truman doctrine" of 80 million dollars worth of military aid. Earlier in the year, the American Military Mission arrived in Ankara to supervise the application of the American aid to Turkey. In October 1947, the Turkish Prime Minister said that the main purpose of the government's policy was to strengthen the armed forces of Turkey.

In April, the Prime Minister declared that the Anglo-Turkish alliance remained as strong as ever, and he recalled the service that it had rendered Turkey in the past. Turkey appears to be relying on American assistance and, indeed, were that assistance not forthcoming at the right time and in the right amount, it is difficult to visualize an independent Turkey once communism had her firmly in its grasp.

Financial Intelligence

Digested by the MILITARY REVIEW from an article by Lieutenant Colonel T. H. Sweeny in the "Journal of the Royal United Service Institution" (Great Britain) August 1948.

THERE is a very close connection between intelligence and finance when dealing with enemy countries. This essay is written in order to show how this occurs, and to bring it to the attention of that very wide circle of officers in the services who have not previously realized it.

The writer's knowledge of our financial investigations only covers what was done—or left undone—in Southeast Asia Command (SEAC), but there were lessons learned in SEAC that may interest many who were outside that command as well as in it.

The Japanese had realized, many months before the first atom bomb, that they had lost their war, and they hid 615 million piastres in French Indo-China, and 2,700 million guilder in the Netherlands East Indies in order to win the peace. The writer was able to bring to daylight again the whereabouts of some 480 million of these piastres and 1,200 million of the guilders, but shortage of staff and time prevented him finding the remainder. We might have been even more successful, however, if the importance of breaking the financial power of the enemy in countries occupied by him after he had surrendered had been explained during the training of our staff.

The "War After War"

Modern war consists of three phases. There is first the "war before the fighting war," which consists of the political war and of underground preparation. Then comes "the fighting war," or the period during which weapons are in the nations' hands. Finally, there comes the third and new phase which I call "the war after the war" or "the war to win the peace." This is an economic and underground war that may last a generation unless it is won early. Moreover, we must realize that this third phase will start before the second ends. The third phase can only be won quickly by strong and rapid financial measures which must be carried out by the victor, backed up by good intelligence and, above all, by first class financial intelligence. The results of the financial measures will produce so much financial intelligence that both subjects must be dealt with simultaneously in order that the effect of the one on the other may be understood.

After winning the fighting war, the commander will find himself faced with two different situations. The first is what he should do in occupied countries out of which he has driven the enemy (or in which they have surrendered). The other is what he should do in the enemy's homeland. Each will present different problems and some of the solutions will differ widely. We will only consider the case of the liberated territories.

How will the enemy's mind work as soon as he realizes that he is bound to lose his war? His politicians and staff will reason like this:

"We will insure that the occupying armies will only find a bankrupt country, which will lead to a rebellious state of mind among the populace and prevent them from turning their full attention onto us. They are certain to declare our currency worthless, and to introduce their own, so let us use as much of it now as we like. There are plenty of local inhabitants who will continue to collaborate with us if we make them rich as well as afraid of us or our secret societies. We will buy up, in their names, a number of fishing fleets (most

useful for taking soundings and preparing charts), shipping, oil, rubber, tin, tea, photography shops, importing firms, etc., and install our friends as shadow owners. If we've got a real grip on them, they'll do what we want after we've gone, and this will get us in on the ground floor for trading in peace.

"In addition, we will buy as many friendships among the local inhabitants as we can. They will come in handy later, and to the more trusted among them we will give large additional funds to be passed on to the leaders of strife and rebellion. Insurrections, underground movements, and rebellions soon collapse without a good solid cash backing, so we will print notes and go on printing them till we've got all the cash we can use for these objects. There will then be so many notes in circulation that inflation will become rampant, and it will be far enough advanced to cause financial chaos by the time we have to stop printing. This will add large numbers to the rebellious and we can always help the inflationary curve upwards by offering higher and higher prices for labor and supplies as we get nearer to our 'last ditch' stand. The local inhabitants will appreciate their paper profits (which won't cost us anything) and we shall become popular and be remembered as the nation under whom they got rich. Meanwhile, the winners are bound to be hated as soon as they declare our notes (and the paper profits) worth nothing. Moreover, a widespread black market can be allowed to spring up and this will embarrass the new occupiers and help to lower the morale of their troops."

These steps are the obvious ones for the losers to take, so let us think out the answers. Before our troops arrive, intelligence should have found out which bank was the controlling bank for the country. This means it controlled the distribution of note reserves to other banks, arranged for the quantities to be printed, and issued financial directives to the rest. It is a safe bet that this controlling bank holds much of the information wanted at the start, and that the enemy's consulate or head political office holds a good bit more. If intelligence can also discover the total numbers and values of all notes printed by the enemy, that will have done good work and save us time when we get there.

Finance section must have ample quantities of suitably designed notes, easily recognizable from the enemy's, ready to take in with them, and should have worked out a scheme to introduce their own currency at the earliest possible moment. Our troops must use it, and no other type, from the very first day. The troops must act as "ambassadors," assuring everyone that the new money is better than the old brand. No amount of protests from the inhabitants should let them be permitted to refuse to take it right from the first, since every day's delay will make it harder to introduce universally throughout the country later. There is not much else that can be done before capturing the administrative capital of the country, though the more financial information that intelligence can secure first the better.

Financial Measures

Once our troops arrive, the logical sequence of the financial measures we must take is:

1. Seize the controlling bank within an hour, with all its vital documents, arrest the entire staff, and segregate them carefully. Do exactly the same with the enemy's consulate or chief political offices.

2. Get hold of the treasury at once and only allow it to function under our own financial control.

3. Freeze *all* bank balances temporarily and only allow some small amounts to be withdrawn by any holder of an account until further orders without the authority

of our financial staff. This order can be relaxed fairly soon for all civilians except collaborators and enemy nationals. Bank accounts are the quickest route to tracing the enemy's friends when the neighbors won't talk!

4. Issue the new currency to banks; declare the enemy's currency illegal, and order it to be handed into the banks within a week against a receipt for credit to accounts. These must at first be blocked.

5. At the earliest possible moment, get a grip on all printing presses and stocks of the special paper used for printing notes, and destroy the old plates.

6. Issue orders designed to get the cash and headquarters military accounts off all enemy troops. This is a military operation that should be carried out if possible at the time the enemy hands in his weapons.

7. In Allied countries of our own, enemy business firms should be taken over or shut down as fast as is consistent with preventing trade in the essentials of life from coming to a standstill. They are useful cover for underground work, since their accounts can easily be made to hide the true destinations of their expenditure.

As regards analyzing the money in circulation, we naturally concentrated first on large issues or withdrawals of currency or credits made by the Japanese after the date when they first realized they were bound to lose the war, and endeavored to trace what had happened to them all. We found quite a number of short cuts by trial and error. We did not worry the staff with any of this technical work. We only wanted them to know what we were aiming at and that it was important, so that they could help by producing witnesses, making arrests, or shutting down firms we suggested.

Examples of Results

During this research work, a surprising amount of information that proved helpful to staffs and departments was unearthed. A few selected examples of financial intelligence from French Indo-China or the Netherlands East Indies will show the various agencies we aided and the sources from which some of the intelligence was obtained.

Special Intelligence Branch and Field Security.—Intelligence in Saigon had captured the pass book of the main account of Chundra Bose's Indian National Army and had it locked up for a month without any idea of its value until a chance remark told me of it. After examining it, we gave them the information that Major General Chatterji, Commander of the Indian National Army (INA), had a banker's draft in his favor for 3,200,000 piastres, cashable in Hanoi, and that he would probably go there to get his money. That is where they caught him in December 1945. We also gave them a list of all prominent people who had subscribed to the INA and, more important, a list of those to whom the Japanese had refunded their subscriptions after VJ-day, obviously to keep the latter friendly.

RAF.—We gave the RAF full drawings to scale, with all constructional details, of all air fields and air strips constructed or improved by the Japanese in Indo-China. We challenged the latter on the accuracy of their statements on air field expenditure and they were so indignant that they produced these drawings to support their figures. The RAF was very pleased to have them.

Fortifications.—In the Netherlands East Indies, we told our Intelligence Section about Japanese defense works near Cheribon, about which they had no knowledge, and gave them useful data on gun emplacements, thickness of concrete, number, length and diameter of tunnels, etc.

Dumps and supplies.—In Java, we were also able to supply information about Japanese dumps which the Indonesians prevented us reaching and which they were

using. This information came from a study of Japanese transport bills during a month, shortly before VJ-day, which showed transport charges to be three times as heavy as normal months.

Medical.—Inquiries into entries in Japanese accounts for purchasing opium led to 50 million piastres worth of the drug being handed over to us by the Japanese.

Food.—We were able to cut down the expense of feeding the Japanese Army by 70 percent as soon as it was discovered from their accounts that they had bought themselves enough food for a year after they surrendered, and had also put nine months pay in their pockets.

Intelligence.—In Saigon, Intelligence Section, Field Security, and the RAF worked with me and we were soon keeping each other primed with anything we thought of value. Intelligence told us of some business firm that had been indulging in subversive activities, so we asked to see their books and they were shut down at once. The information dug out of these books led to other firms being closed.

British Trade.—The British banks operating throughout French Indo-China before the war were the Hong Kong and Shanghai and the Chartered Banks. Both had been shut down by the Japanese the day they marched in, their staffs interned, and their assets seized. One of the first things we discovered from the Japanese accounts was the amount of those assets in November 1941, and we were able to start each bank off early with its opening balance exactly as if time had stood still for four years. British trade got a useful start of three months over its rivals in French Indo-China, thanks to having the only foreign banks functioning during that time.

Military Intelligence (Political).—In the Netherlands East Indies, there was already great confusion through the existence of three currencies circulating at the same time, and we heard rumors that the Indonesians intended to flood the countries with a fourth currency printed by themselves. This would have caused complete chaos. We wanted very much to find out whether this currency had already been printed and to inspect it as soon as possible if it had been. I was able to get hold of a set of these notes immediately after they had been printed some 500 miles away and to examine them. This showed that they were printed on such bad paper and could be forged so easily that they would not be worth issuing. The Indonesians agreed not to issue them, at any rate not at that time.

These were only some of the matters about which financial research work provided information. When it is realized that one captain was the sole staff available to assist the writer, and that these investigations were in addition to our official duties, it will be seen how much more might have come to light if a number of trained investigating teams had been available.

No armed force can be a powerful instrument for maintaining an acceptable peace unless it is clearly prepared for instant and effective action to overcome aggression.

General Muir S. Fairchild

Soviet Planes and Their Designation

Translated and digested by the MILITARY REVIEW from an article by Cyrill Bürgel in "Flugwehr und -Technik" (Switzerland) July 1948.

The first period of aircraft designation in the Soviet Union, 1925-1940, may be called the era of experimentation and uncertainty. At that time, the so-called F-system, which is still in use in the United States and Sweden, was employed.

The designations formed in accordance with the F-system consist of the first letter, or letters, of the word denoting the purpose for which the plane is to be used, plus a serial number. For example, a fighter-plane in Russian is transliterated *istrebitel*, abbreviation, I. Thus, the 26th fighter plane is called *I-26*. Additional examples are given in the following list:

RUSSIAN	ENGLISH	RUSSIAN ABBREVIATION
Istrebitel	Fighter	I.
Morskoi Istrebitel	Naval fighter	MI.
Blizki Bombardirovshchik	Short-range bomber	BB.
Dalni Bombardirovshchik	Long-range bomber	DB.
Tyazheli Bombardirovshchik	Heavy bomber	TB.
Avtogir	Autogyro	A.
Razvedchik	Reconnaissance plane	R.
Uchebni	School plane	U.
Uchebni Trenirovochni	School and training plane	UT.
Pochtovi/Passazhirni Samolet	Mail and passenger plane	PS.

Every plane had, however, not only one but several designations. The prototypes were assigned the letters *TsKB* (Central Designing Bureau), or *TsAGI* (Central Aero-hydrodynamic Institute, special for helicopters), and a number. When a military plane was transformed into a civil plane, or vice versa, then, again, it was designated in an entirely different manner.

Thus, an outside observer could become greatly confused.

The second period began in 1941. The previous designations were revised and simplified. The new system made use of the first letters of the name of the chief designer, plus a serial number, which denoted the number of planes which had been built using the plans of that particular designer.

There is, however, an important exception. Flying boats, or hydroplanes, are still designated in accordance with the old system.

The earlier designations were, to a large extent, changed to the new system. Examples: *TB-7* was changed to *PE-8*, *DB-3* to *IL-4*, *I-26* to *YAK-1*, and *U-2* to *PO-2*.

Aircraft Designers

In order to have a better understanding of the system, it is helpful to know something about the Russian aircraft designers.

Sergei A. Ilyushin (abbreviation IL). Ilyushin was born in 1894. At the age of 15, he left his father's home and found work in Leningrad. A few years later, he was given work at a Moscow air field. There, impressed by the possibilities of flying, he resolved to devote his life to it. During World War I, he served first as

an infantryman, then as a mechanic in the Russian army. When the war ended, Ilyushin entered the Zhukovski Aeronautic Academy. His first construction, a glider, dates from 1926. Soon after this, he was ordered to the air force experimental station. There, Ilyushin constructed the *TsKB-26*. From this, he later developed the *DB-3F* (now *IL-4*). One of the most famous aircraft in World War II, the *IL-2 (Stormovik)*, was designed under his direction. In the *Stormovik*, rocket armament was used effectively for the first time. Today, its improved form, the *IL-10*, is in use by the combat air forces of the Soviet Union. He was also the designer of two commercial planes, the two-motored *IL-12* for 27 passengers, and the four-motored *IL-18*, for 60 passengers.

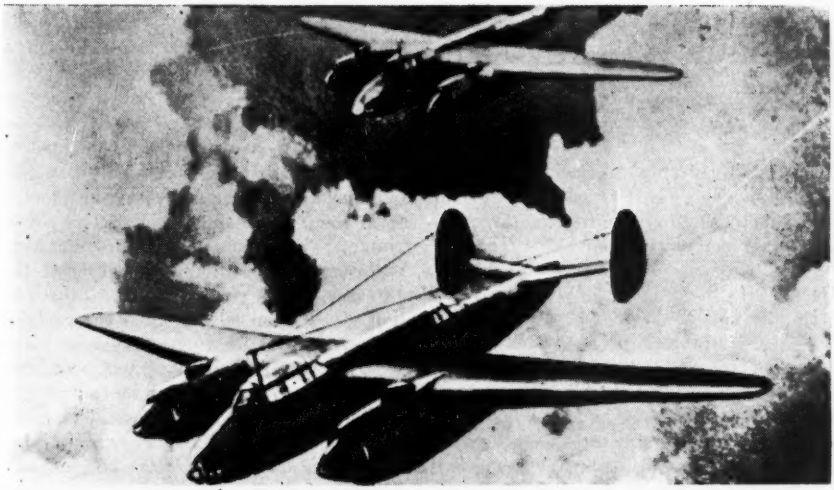
Sergei A. Lavochkin (abbreviation LA or LAGG). Lavochkin was born in Smolensk in 1900. He is the leading Russian designer for single-motor fighters. In collaboration with Gorbunov and Gudkov, he developed the *LAGG-1*. In 1940, the *LAGG-3* was developed and was used against the Germans a year later. In the opinion of many Germans, it was superior to the *Me-109*. The characteristic features of the *LAGG* fighter, as well as the *YAK* fighter, are small wing-load, great speed, and maneuverability at low altitudes. At the end of World War II, the *LAGG-5* was the standard fighter of the Soviet Air Force. The *LAGG-7* is another modern fighter-plane.

Vladimir Petlyakov (abbreviation PE). Vladimir Petlyakov comes from Rostov (born in 1891). At first, on account of poverty, he was unable to attend school. He was obliged to earn his living as a railroad worker. Later, however, he was able to attend the Moscow Technical High School. At 31 years of age, he passed the examination as engineer. He entered the TsAGI (Central Aero-Hydrodynamic Institute) where he awakened the interest of Tupolev. Petlyakov was given the opportunity of working as his assistant. Enthused by Tupolev's work, Petlyakov developed a heavy bomber, the *TU-8*, which was preceded by the *TB-7*. He entered into a very different field with his heavy fighter-bomber, the *PE-2*. The *PE-3*, an improved model, is used at present in the Soviet Union, Poland, and Czechoslovakia.

Andreas N. Tupolev (abbreviation TU, earlier ANT). Andreas Tupolev, who is 50 years of age, is the best known of the Russian airplane designers. Together with Professor Nikolai E. Zhukovski, the "father of Russian aviation," he founded the TsAGI Research Center in Moscow. Tupolev first attracted attention with his *ANT-3* transport plane, with which Gromov in 1926 undertook a flight around Europe. With the *ANT-4*, Gromov and Chkalov flew from Moscow to New York. Tupolev has designed some 20 different models and has also assisted other designers as, for instance, Ilyushin with his *IL-4* and Petlyakov with his *PE-8*. The best known of Tupolev's planes is his two-motored *TU-2* bomber, with which he won the Stalin prize in 1943. His latest model, the *TU-70*, shows a strong resemblance to the American *B-29 Superfortress*.

Alexander S. Yakovlev (abbreviation YAK). Alexander Yakovlev, who is not yet 50 years of age, is the youngest of the leading Russian airplane designers. His aviation career was begun with the construction of flying models, with which he won many prizes. In 1926, he passed the entrance examination for attendance at the Zhukovski-Aeronautical Academy. Here he designed his first plane, a light sport model. When Yakovlev had finished his studies, he went into the airplane industry. In 1936, he won first prize with his training plane, the *UT-2*, in a flight around the Soviet Union. A short time later he was appointed chief designer. His first military

The Soviet Union changed its system of aircraft designation in 1941, using the first letters of the designer's name, plus a serial number. Above, a *YAK-3* fighter, designed by Alexander S. Yakovlev. Below, two *TU-2* bombers, designed by Andreas N. Tupolev, the best known Russian designer.



model appeared in 1941, the fighter *I-26* or *YAK-1*. Since that time many other models have followed, especially the *YAK-14* liaison plane, the *YAK-6* and *YAK-8* light transport planes, and the *YAK-3* and *YAK-9* fighters. Yakovlev, who has the rank of a lieutenant general and who is People's Commissar for Aviation Production, has also produced a jet plane.

Artem. I. Mikoyan (abbreviation MIG). In collaboration with Mikhail I. Gurevich, he designed the *MIG-1*, *MIG-3*, and *MIG-5* fighter planes. Mikoyan is also designer of the sport plane *Utka* (duck), and of a two-motor jet plane.

Other Russian designers include the following:

Nikolai N. Polikarpov, the designer of the *PO-2*, was killed in July 1944. The *PO-2* is also used as an ambulance plane.

S. O. Shcherbakov has designed light transport planes and gliders. The *Shche-2* was employed for supplying partisan forces. It is now employed by the Polish armed forces for transporting paratroopers.

P. Sukhoi designed the *SU-2* single-motored reconnaissance plane. His name is often incorrectly written Sukhon.

Yermolaev (abbreviation *YER* and not *ER*) occupied himself with medium bombers. He is reported at present to be engaged in the construction of a heavy bomber.

Ivan P. Bratukhin designed the *Omega* helicopter. This craft is powered by two radial motors and is able to attain a speed of 120 kilometers per hour.

Jet Aircraft

In addition to their radial motors, a few *MIG-5* fighters possess rockets for increased speed. The latter are located either under the wings or in the rear of the fuselage.

The principal noteworthy feature of Russian jet aircraft is the fact that the power plant is located under the forward portion of the fuselage. This arrangement strongly resembles that of the German *Messerschmidt-262* fighter. It is reported that in Czechoslovakia at the present time, the *RIA* (Aerodynamic Research Institute) is conducting tests with a few converted *Me-262s*. In these planes, the motors were located under the fuselage. It is possible that this arrangement is the same as that which is coming into use in the Soviet Union.

The following two types of planes are in use on operational fronts by the air force of the Soviet Union.

The *MIG* fighter, with two jet motors, is a single-seat, midwing monoplane, of metal construction. The wings have a negative, trapezoidal, slightly dihedral form, with angular tips. The triangular section of the fuselage resembles that of the *Me-262*. Both motors are located under the forward portion of the fuselage. The rear end of the fuselage curves upward so as not to be touched by the exhaust stream. The main wheels are folded inward, the bow wheel folds back between the two motors. The cabin is located ahead of the leading edge of the wings. The power plant consists of two axial-flow type jet motors. Armament consists of two heavy machine guns and one cannon. The wing span is 43 feet and the length 39 feet.

The *YAK-15* fighter has a single jet engine. It is a single-seat, midwing monoplane of mixed type construction. Wings and elevator appear to have been adopted from the *YAK-3* and *YAK-9*. The power plant, as in the case of the *MIG*-fighter, is located under the forward portion of the fuselage. This plane is one of the few jet-propelled models with a rear wheel. In contradistinction to the *MIG*-fighter, the pilot in the YAK-jet plane has poor visibility. The axial-flow jet motor is probably modeled after the *BMW 003*. The plane mounts two heavy machine guns and one cannon and has a wing span of 33 feet and a length of 31 feet.

Air-Ground Support

Translated and digested by the MILITARY REVIEW from an article by Major Fernando Querol Muller, Instructor at the Advanced School of the Air Forces in "Ejército" (Spain) July 1948.

THE relationship between air and ground units operating together usually consists of the following parallel levels of command:

1. In each theater of operations there is a strategic air force.
2. With each army group, a tactical air force.
3. With each army, a tactical air command.

In the lower echelons, there should be no fixed assignment of air units and such assignments should be on a temporary basis only or as needed. However, an army corps usually will have auxiliary artillery aviation permanently assigned and a division will have auxiliary infantry aviation.

In analyzing these joint organizations, we should first study the characteristics of the air units.

Each theater of operations has a strategic air force composed of bombers and long-range fighters with the mission of attacking the enemy zone of interior. It provides remote air-ground support only indirectly. Both the strategic air force and the ground units of the theater of operations work toward the same goal, destruction of the enemy, although at different places and against different objectives.

The primary mission of the air force is the destruction of the economic potential in the rear areas of the enemy and the destruction of war materials at the industrial factories and depots. One accurate bombing of a gun factory, for example, can destroy all the guns which, once they reach the front and are deployed, camouflaged, and perhaps protected by concrete emplacements, would require hundreds of troops to put out of action. This characteristic of long-range bombing, covering the whole of the enemy country, is the one factor that makes modern war total.

The tactical air force in support of each army group is subdivided into several tactical air commands to operate with the armies, which in turn assign the air units to the army corps and divisions.

The two missions of the independent elements of the tactical air force are: to attack enemy traffic out of the range of the artillery and to provide air cover for the deployed units of the army group.

This, then, is a second method of employment of the air force: providing direct support for the ground army by giving it air cover and diminishing the logistical capabilities of the enemy.

This method of employment is probably the most profitable in the field of direct support. It utilizes more fully the characteristics of aviation and acts only where it can reach objectives that are not likely to be confused or difficult to identify.

There is a tactical air command operating in direct support of each army. Its normal employment is to fly missions against the most advanced enemy rear areas, thereby substituting for the old long-range army artillery.

We have already mentioned that the tactical air command will at times assign some of its units to the corps or divisions, for specific missions, in order that they will not be idle during lulls in the ground fighting in a particular sector.

At the army corps echelon, auxiliary artillery aviation adjusts both regular and counterbattery artillery fires.

Finally, the auxiliary infantry aviation helping the division attacks close-in enemy

positions, a mission in which the artillery can assist by firing marking projectiles.

With the increased speed of aircraft making the identification of front lines and the detection of ground bursts for artillery fire adjustment more difficult, it is necessary to increase the degree of coordination and liaison and to establish a more effective organization for air-ground support. This is intended to prevent what is commonly known in airmen's language as "piracy," that is, a misdirected attack on friendly positions.

Every aircraft, in addition to its particular mission, must always try to furnish information about the enemy as a secondary mission. Aircraft to fly specific reconnaissance missions also exist as components of the above listed units.

These points may be summarized as follows:

1. In each theater of operation, there is a strategic air force whose action against the enemy zone of interior can break the enemy's will to resist, and may possibly bring victory by itself.

2. In each army group, there is a tactical air force which furnishes practical support to the ground forces by providing air cover and by weakening the enemy by attacking his supply lines.

3. In each army, there is a tactical air command which attacks the second line of the front and provides units in support of corps and divisions.

Air-Ground Cooperation Problems

The main problems in air-ground cooperation can be reduced to three: lack of understanding between airmen and soldiers, improper liaison, and the slowness of arrival of planes after the request for air support has gone out.

The same reasons that made the army organize general service schools to blend all the old independent doctrines have forced all nations to establish training schools common to the three main services.

Not long after German rearmament began, General Halder directed that 30 selected officers of the *Wehrmacht* be trained for several years in the Air Force and the Navy, receiving training as pilots and participating in maneuvers involving aerial and naval landing and navigating all types of ships, until they had acquired detailed knowledge of the other services.

During World War II, General Wavell and Marshal Tedder established an Air-Ground Support Staff School at Mount Carmel, Palestine, where six-month courses in air-ground support were conducted.

The Armed Forces War College was established in France in 1946 to train personnel in joint operations involving the three services.

The School of Combined Operations in Fremington, England, and the Joint Staff School at Chesham were organized in 1947. Graduates from the staff schools of the respective services are sent to this school, which is commanded in turn by an army colonel, a naval captain, and a group captain of the RAF. Also, during 1947, the Armed Forces Staff College was established in the United States.

All these countries, understanding the necessity for having officers available who are familiar with all the modern means of waging war, are trying to train them for staff positions in any future amphibious or triphibious operation, or to command forces containing all three services. Such a task faced General Eisenhower in Algeria and Normandy, Admiral Mountbatten in Burma, and Marshal Kesselring in Italy.

Evidently, it requires careful selection and repeated efforts to acquire perfection unless one desires to end up like the goose, which walks, swims, and flies, but cannot perform well in any one element. Pride, prejudice, suspicion, and common isolation must disappear. The armed forces must

be united into a single entity with only one language and with the same reaction to a problem. Only when this has been done will the lack of understanding and differences in judgment be solved.

The second difficulty comes from improper liaison. Let us examine how the Allies solved this problem.

The first step was taken in the desert in Libya and Egypt, when General Wavell and Marshal Longmore established their staffs together, thereby forming a combined headquarters and eliminating intermediate communications. The high-level common study of situations and decisions strengthened their air-ground cooperation.

The second step was the establishment of two types of liaison parties. The "forward control party" included an officer-pilot working with the front line unit to interpret the requests for air support, translate them into the airmen's language, and send them by telephone to the combined headquarters. At every air field, there was a "ground liaison officer" acting as an advisor on ground support matters. He would translate the information brought back by the air crews into terms understandable to the ground force and send it to the ground headquarters. In short, he acted as a liaison officer between the ground headquarters and the air units.

The third step was the motorization of the liaison and control parties and the substitution of radio for wire communication. This was accomplished during the Sicilian campaign (July 1943), using jeeps. Later, the parties were also put in tanks and in light planes. With the introduction of radio, the "forward control parties" took over an additional mission: to direct the actual attack of the objective by the air units from the jeep, tank, or light plane.

Reviewing what has been accomplished up to now, we see the unification of general staffs into combined headquarters, and through it quick radio-telephone communication between the "forward control party" and the air field. Liaison is excellent; the liaison parties eliminated the initial difference in technical language, achieving uniformity through constant efforts towards unification. Meanwhile, the "forward control party" on wheels, tracks, or wings increased the accuracy of the supporting air units.

The slowness of arrival of the air support units is the last difficulty to be considered. Various expedients were used to increase the speed with which the air units would carry out a ground request.

First, air fields were built nearer the front. In North Africa, Marshal Tedder ended up by placing the air fields of the units in direct support of front line troops only 20 kilometers from the front. By this action, within a few minutes after the transmission of a request by the "forward control party," the airplane would be taking-off.

There was always an unreducible amount of time lost by the transmission of requests and orders, take-off, and the approach to the front by the airplane. A system to combat this loss of time, called "cab-rank," was adopted in Italy. This system consisted of maintaining a regular take-off schedule, putting a unit into the air at regular intervals regardless of whether there was a request for it. In that way, there was assurance that an air unit would be available at or near the front at all times. The objectives and method of attack were radioed to the approaching airplanes by the "forward control party." A system frequently employed by the Allies consisted of sending six fighter-bombers every hour over the "forward control party" of each division. The system of "cab-rank" is very expensive and can only be used by powerful nations having a great wealth of planes and personnel.

Conclusions

These measures, needed for adequate coordination of the army and the air force and to make air support quicker and more effective, were achieved at the end of the war. These were demonstrated by the results of Allied air-ground cooperation over and on the battlefields. All this, together with air cover, isolation of the battlefield, and the destruction of the enemy's national potential, illustrates in its different aspects the perfection obtainable in air-ground support.

If we want efficient air-ground cooperation, we must take advantage of lessons learned in the past war. Since it is necessary in Spain to start at the beginning, we should concentrate on the initial steps taken by the Allies, remembering two fundamental principles:

1. Officers of the air and ground forces must study the problems of common interest together, preparing themselves for planning and executing combined operations.

2. The ground and air commanders must establish the closest type of liaison, from the highest to the lowest levels.

Demolitions in Delaying Action in Mountains

Translated and digested by the MILITARY REVIEW from an article by Captain A. Dessibourg in "Revue Militaire Suisse" (Switzerland) August 1948.

THIS episode in the Italian campaign shows us the value of demolitions in a mountainous terrain similar to that of the Swiss Alps. The assailant was placed in situations which severely tested him. However, due to the numerical weakness of the defender, no engagements of any magnitude took place.

Montgomery desired to launch his offensive along the Adriatic coast with V Army Corps. In order to mislead the enemy as to the direction of his main effort and to attract the attention of the Germans to the mountain sector, he ordered the Canadian 1st Division to attack in the direction of Alfedena and, afterwards, in the direction of Roccaraso.

The Canadian 1st Division received its mission at the beginning of November 1943, when it was occupying the Campobasso area. General Simonds, the division commander, ordered the 3rd Brigade to drive the Germans from the Carovilli-Ateleta and Isernia-Alfedena sector and afterward to patrol the right bank of the Sangro River.

In front of the Canadians, the slopes of the Abruzzes were occupied by elements of the German 1st Paratroop Division which had been reorganized as a mountain infantry force. They had organized two strong points at Carovilli and Agnone. Elsewhere, the terrain was defended by mobile elements.

Setting out from Vinchiaturo, the 3d Canadian Brigade took Isernia on 4 November. On its left flank, one battalion advanced on Rionero, which it reached a week later. Alongside of it, the main body of the Brigade hammered at Carovilli, which it captured on 16 November after hard fighting.

The Germans pillaged the terrain on both sides of the Sangro in order to deprive the Allied troops of all housing in that area during the winter months. This also created a terrific refugee problem. The homeless civilians crowded the roads

and highways. Everyone was seeking refuge back of the Allied lines. Hence, the trucks returning to the rear to Campobasso assisted these shelterless men, women, and children.

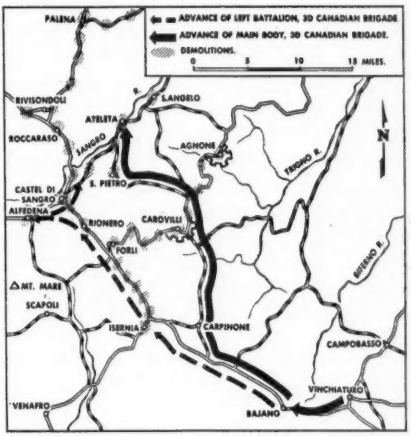
In this terrain, soaked by the rain and snow, much labor was required to keep roads in repair. Under these conditions, supplies carried by mules were very uncertain. It was necessary to wait till 24 November for the battalion to the left of the Brigade to seize possession of Alfedena.

Finally, on 26 November, contact was established with the Germans at Castel di Sangro, where furious fighting took place for the possession of the hill which dominates the area. The Germans were finally forced to abandon this position, which commanded the defile through which the Sangro flowed.

The crossing of the river in this sector was not attempted by the Allies until 6 June 1944, in spite of the limited German forces remaining in this region. It was not of any tactical advantage to the Canadians to sacrifice troops in order to get onto the left bank of the Sangro, where they would only have found devastation and mine fields.

What was the influence of demolitions on the operations of these Canadian forces? We shall draw a few conclusions with reference to the battalion on the left, whose advance from Vinchiaturo to Castel di Sangro we have followed.

Communication routes were rare in this mountainous region. There was only one route that could be utilized by the units which were advancing toward Alfedena. Over the stretch of 19.8 kilometers between Isernia and Rionero, they encountered 26 demolitions. It is not surprising, therefore, that it took them a week to cover this distance. One may easily imagine the difficulties this battalion was obliged to overcome after being forced to abandon its vehicles. It was the infantryman who opened a passage, climbing over the obstacles and laboriously opening a way through the rock. The convoys traveled to the rear in search of materials for the reconstruction of the route over which supplies and persons to be evacuated were to pass. But the more numerous the demolitions became, the more difficult it became to find the materials necessary for constructing a bridge, a footbridge, or for supporting a section of the route that had collapsed. Let us not be deceived by the thought that the Germans had limited themselves to the creation of gaps de-



signed to stop tanks. They had carried out every sort of demolition capable of hindering all progress.

The Germans withdrew back of their demolitions, but active and aggressive patrols roamed the sector, ready to deliver brief but well-aimed bursts of fire.

The first effect of the demolitions was, therefore, to paralyze the movements of the Canadian troops. In this irregular terrain, such destruction completely prevented the use of vehicles.

The advance of the Canadians became still more laborious between Rionero and

Alfedena. It took from 12 to 24 November to travel 12 kilometers, although the demolitions were less numerous. But the distance to the source of supplies was increasing, and it was necessary to live and take care of all their needs with the supplies that could be transported over a single route. Getting off this artery was impossible, for the clay soil of the Abruzzes, transformed into a sea of mud, was sown with antipersonnel mines. The reconstruction carried out at breaks in the route did not permit double traffic, and the traffic capacity of the route was extremely low. We learned recently that this condition still persists in many places in spite of Italian efforts at reconstruction.

The Germans did not content themselves with cutting the communication routes and barring the adjoining terrain by the use of mines. In accordance with a systematic plan of destruction, they destroyed everything that could have been of any use to the Allies. Houses were blown up, their debris obstructing roads and highways. Such ruined villages presented a major obstacle to the Canadians. For example, from Castel di Sangro to Palena, all the houses were razed with the exception of those of Rivisondoli.

Thus, although they were not protected by fire, demolitions alone succeeded in slowing the progress of the Allies and even in stopping them at the Sangro.

The lessons which we can learn from this episode of the Italian campaign are interesting, for they prove the effectiveness of the demolition weapon in mountains. Their effects on operations are quite tangible, even though their action may be exerted over only a small area. But, on the other hand, they must be sufficiently numerous to exceed the preparations and means of the invader.

Naturally, we should not put into operation on Swiss soil the "scorched earth" tactics which the Germans employed along the Sangro. This would impose hardships on our population which could not be thought of. On the other hand, this example shows us the judicious employment which can be made of demolitions in a country as limited in extent as Switzerland and with an equal density of population.

In modern war, all people are under threat. All people must be prepared to defend themselves and be prepared for the shock of war, possibly in their home communities. We can never provide professional troops to perfect protection for every community and every foot of our territory. We cannot hope to recall men from the battlefield to clean up air drops behind the lines, or to quell civil disturbances incited by enemy agents, or to deal with air attacks or other disaster at home.

Lieutenant General Raymond S. McLain

Korea—Cockpit of Eastern Asia

Digested by the MILITARY REVIEW from an article by Colonel Brian R. Mullaly in "The Army Quarterly" (Great Britain) October 1948.

IMMEDIATELY following the collapse of Japan, the Iron Curtain descended across the Korean Peninsula and the northern half of the country has since been enveloped in a dark seclusion even more intense than that which once earned for it the name of "The Hermit Kingdom."

It was agreed between the Allies that all Japanese forces found south of the 38th parallel of latitude should surrender to the Americans. Those to the north of that arbitrary line should surrender to the Russians. It was never intended that the two zones of occupation should form a permanent partition of the country. The Russians, however, having moved into Northern Korea immediately on opening hostilities, were already on the spot when the end came and there they remained and erected another version of the Iron Curtain to which we have become so painfully accustomed in Europe.

This development has dashed the hopes of those who saw the vision of a regenerated and independent Korean nation rising from the debris left by centuries of native misrule and decades of foreign oppression. The melancholy history of the country and the character of its people are, however, such as to arouse serious misgivings as to the readiness of Korea for self-government. The hard facts of geography remain the determining factor in the future of a small country which, like Poland, has always been a bone of contention between great powers.

Historical Background

Korea was originally the name of one of the three kingdoms into which the peninsula was divided, and the name was later applied to the whole country. For many centuries, the native and official name has been Chosen, signifying "Freshness, or Serenity, of the Morning," hence "Land of Morning Calm." Though Korea was ruled, or rather misruled, for centuries by native dynasties, she owed shadowy allegiance and paid perfunctory tribute to China. The latter, however, concerned herself little with Korean affairs except when she became periodically alarmed at the designs first of Japan and later of Russia.

Korea became the principal prize in the Sino-Japanese War of 1894-1895 simply because of her geographical position. The Japanese felt called on to push back Russia from the shores of the sea which the island kingdom was determined to make her own as a preliminary to the eventual consolidation of her position on the mainland. The Chinese defeat opened the eyes of the world for the first time to the growing potentialities of Japanese military strength. The independence of Korea followed, for China was compelled to abandon her suzerainty. But Korean independence was only nominal and the country lay open to the rivalries of Japan and Russia, both of which could now pursue their respective aims without the embarrassment of possible complications with China.

Japan had thus taken the first step in her plan of continental expansion and one of the most important results of the victory over China had been to arouse the Japanese people to a condition of fervid nationalism and to open their eyes to the dazzling prospects of a Greater Japan. Thereupon, they girded themselves for what they now knew to be the inevitable struggle with Russia for the mastery of eastern Asia. Control of Korea was essential to Japanese security and expansion as well as to strategic

preparation for the coming struggle with Russia. The years between the two wars witnessed a characteristically thorough Japanese effort to establish complete ascendancy over the frightened and effete Korean government. This effort was to pave the way for the use of the peninsula as a springboard for a continental campaign.

Broadly speaking, Japanese influence was already predominant in the southern part of the country, while Russia, seated on the Yalu and Tumen Rivers, was in a position to exert pressure in the north. At the same time, both powers competed in Seoul, the capital, to obtain all possible political, commercial, and economic advantages at the expense of each other. In this competition, the indolent Russians came off decidedly second-best and the Japanese had, in the space of a few years, secured a virtual stranglehold over the economic life of Korea and had instilled into the Korean rulers a wholesome respect for Japanese determination and potentialities for future aggression.

All this was but the overture to the great drama which was destined to bring Japan into the ranks of the great powers and to set her feet on the broad road which has led to her destruction. The curtain rose when Japan, judging that her hour of destiny had struck, declared war on Russia in February 1904.

Her immediate object was to regain Port Arthur and to prevent Russia from securing control of Southern Manchuria. In order to carry out this object, it was necessary to secure Korea, both as a jumping-off ground for future operations and to remove, once for all, the mortal threat of Russian occupation of the peninsula.

In the pursuance of this plan, the first step taken by the Japanese was the embarkation on the day that diplomatic relations were broken off of a force which sailed immediately for the port of Chemulpo on the west coast of Korea. At Chemulpo, the escorting Japanese squadron surprised and sank two Russian warships lying at anchor. Japanese troops were at once pushed on to the capital, while other detachments occupied Fusan, the southernmost port nearest to Japan; Gensan, on the east coast; and Pingyang and Chinnampo in the north. The Japanese forces thus rapidly secured control of the main strategic points, forestalling the dilatory Russian commanders. There followed the decisive battle of the Yalu River in which the Japanese armies inflicted a signal defeat on the Russians and drove them from Korean soil.

As a result of the war that followed, Japan emerged as the dominant power in the Pacific, with Korea inevitably falling under her absolute and unchallenged domination. The formal annexation of the country, which took place in 1910, set the seal on the accomplishment of her aim of securing her position on the mainland of Asia.

With annexation, Korea became a Japanese colony, ruled with an iron hand, and virtually a country of 20 million slaves.

Japanese Control

Centuries of the easy-going Chinese suzerainty, which demanded little more than the payment of formal tribute, had made Korean national consciousness a plant of slow growth. A national consciousness, however, began to take firm root soon after the inauguration of the Japanese regime. Although the patient Korean peasantry accepted their new masters with characteristic resignation, the arrogance, rapacity, and innate cruelty of the Japanese stimulated the emergence of a small but determined Korean independence movement. Although ill-organized and lacking in popular support, it succeeded in causing the paramount power

a good deal of minor trouble and gradually drew foreign attention to the more blatantly inhuman aspects of the Japanese administration. This was a true reflection of the Japanese character—energetic, efficient, and ruthless, but entirely soulless. On the one hand, it developed the country to a remarkable degree, improving communications, modernizing commerce and industry, and greatly increasing the agricultural output. On the other hand, it was devoid of any ideal of social and moral betterment, let alone the conception of training a subject people for eventual self-government. Every effort was made to stamp out traces of a separate Korean nationality by imposing Japanese manners and customs, enforcing the teaching of the Japanese language in the schools, and actively discouraging all manifestations of national culture that were not strictly in accordance with the theory of grateful dependence.

The Kempei, the notorious gendarmerie of Japan, closed its iron grip on Korea and every sign of awakening nationalism was repressed with ruthless savagery. This resulted in the periodical perpetration of bloody reprisals on the bands of bandit-patriots which had established themselves in the mountainous border districts of the north. News of these atrocities, which often extended to the destruction of the lives and property of innocent villagers, gradually leaked out and the outside world became aware of the existence of a Korean independence movement, small and weak, but nevertheless in being. Many members of this movement have, in the course of time, taken refuge abroad—some in the United States and some in Manchuria and China. The former have absorbed something of the ideals of western democracy, and the latter, in most cases, have come under Russian communist influence. The result is painfully manifest in the dire disunity which now rends Korea, quite apart from the major problems of power politics which are involved.

As for the mass of the Korean people themselves, the long and steady course of "Japanization" to which they have been subjected has left its marks upon them. But in spite of this, their fundamental character has undergone little change and the Korean retains his rather docile, rather indolent, and infinitely patient character.

And herein lies a great danger, for it must be remembered that a whole generation has known no other rule than that of Japan. To the long-suffering peasant, one tyrant is much like another, and he has been for too long cut off from intercourse with the outside world to understand the concepts of freedom as expressed by our brand of democracy. The sudden removal, therefore, of a strong and ruthless rule has left the Korean people a prey to conflicting emotions and ideologies. Unprepared as they are to enjoy the blessings of free and enlightened self-government, they are temperamentally inclined to take the line of least resistance and to submit to whatever form of government is imposed upon them.

Aftermath of World War II

Soviet Russia's eleventh-hour declaration of war on Japan in 1945 gave her all she had coveted for centuries, with negligible expenditure of blood and treasure. She now stands supreme and unchallenged in eastern Asia—back in Port Arthur, back in control of Manchuria, in occupation of the whole of Sakhalin and the strategically important chain of the Kurile Islands, and firmly planted in the northern half of Korea. Behind the barrier which has been erected at the 38th parallel, the usual Russian technique is being followed and nobody may cross the border on pain of death. The situation is further complicated by the fact that the food-producing areas lie mainly in the south, while the greater part of the coal, iron, and power-

producing resources of the country are in the northern zone. All attempts to arrange exchange of raw materials and commodities have failed. As a result, Korean economy has been thrown completely out of gear. Furthermore, affairs in the south have been conducted on the usual democratic lines with complete freedom for all and the encouragement of moderate elements, with a view to the holding of free elections and the establishment of representative government. In the northern zone, the communist dictatorship reigns supreme and a thoroughly indoctrinated and well-armed native communist army has been formed, ready to move south at the behest of its masters. The core of this communist force is composed of former rebels against Japanese rule who for years carried on intermittent guerrilla warfare in the border regions between Manchuria and Korea and later came under Russian influence. To their aptitude for irregular tactics, there has now been added training with modern weapons and direction by Russian officers, a combination which makes them a force to be reckoned with.

The situation in the south is very different. In Korea, as in China, the profession of arms has always been traditionally despised. Left to himself, the average Korean has little inclination or aptitude for soldiering. During the brief period of Korean independence, an attempt was made to establish a small standing army on Western models, but the short-lived product was little more than a joke. While under Japanese domination, Koreans were rigorously excluded from service in the armed forces. The result is that there is no tradition of military service.

The solution of the Korean problem is nominally in the hands of the United Nations, but in practice it is only the nation with troops on the spot that can effectively influence the outcome, and that means the United States. It is highly improbable that the United States would be willing to allow its troops to hold the lists in a Korean civil war, and withdrawal before the situation further deteriorates seems the logical alternative. Nevertheless, willing or not, the United States is likely to find that the stakes involved are too high to permit withdrawal for a very considerable time to come, for they now stand in the place of Japan as the bulwark against communism in eastern Asia. The effects of a communist-dominated Korea would be both ideological and strategic and in both cases they would be primarily directed against Japan and the American position in the Pacific. With a communist Korea, intensive infiltration of Japan would be a certainty and would aim at hampering the faltering advance of the defeated Japanese people along the hard road of democracy. Strategically, control of the air fields of Manchuria already confers a considerable degree of air power over the Japanese archipelago and the surrounding seas. Extension of this control to the air fields of Korea would greatly enhance that power.

That the United States is fully aware of the strategic implications of the situation in Korea is evidenced by the great developments which are taking place in the creation of a system of powerful air bases in Japan and Okinawa. The number of air fields in Japan itself is limited, but the combination should insure the deployment of sufficient air power to dominate Korea and Manchuria if necessary.

And so Korea, the pawn in two wars, has become the battleground of conflicting ideologies and an important outpost in the universal fight against communism. Surrender of this outpost would be a victory for the forces of darkness and a betrayal of the long-suffering Korean people, who deserve a better fate than abandonment to the tender mercies of another and more vicious oppressor.